1855/1865

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WAVETEK
5808 CHURCHMAN, P.O. BOX 190
BEECH GROVE, IN 46107
317-787-3332
(TOLL FREE OUTSIDE INDIANA)
1-800-428-4424

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INTRODUCTION

The 1855/1865 Sweep Recovery System was designed specifically for broad band cable system sweeping. The microprocessor control provides the user with the capability to program a wide variety of sweep parameters. In addition, digital processing of sweep and TV signal information provides an extremely accurate representation of the frequency response. The result of this use of state of the art technology is sophisticated test equipment that provides quick and easy measurements.

This manual supplies detailed theory of operation, calibration procedures, parts lists, and schematics. It is intended to be used by technically trained personnel for calibration and fault diagnosis.

CONTENTS

			PAGE
SECTION	1.	1855/1865 THEORY OF OPERATION	1
	1.1	Model 1855 Transmitter	1
	1.2	Model 1865 Sweep Analyzer	2
	1.2.1	AVG Mode	5
	1.3	Model 1855 Transmitter Individual Assemblies	6
	1.3.1	Front Panel Board	6
	1.3.2	Microprocessor Card	6
	1.3.3	Latch Card	8
	1.3.4	Ramp Card	8
	1.3.5	M9L-1 Oscillator-Mixer	10
	1.3.6	M135 PSK Modulator	12
	1.3.7	M138 Loop Counter	12
	1.3.8	DPS10 Power Supply	12
	1.3.9	M113 Selective Blanking Option	13
	1.4	1865 Receiver Individual Assemblies	14
	1.4.1	M117 Amplifier/Programmable Attenuator	14
	1.4.2	M118 Differential Biased Detector	14
	1.4.3	M119 PSK Detector	15
	1.4.4	Model 1865 Vertical/Horizontal Timing Card	15
	1.4.5	Control Register Card	21
	1.4.6	1865 Microprocessor Card	22
	1.4.7	Model 1865 A-D Data Memory Card	23
	1.4.8	CRT	26
	1.4.9	Power Supplies	26
SECTION	2.	1855 Calibration Procedure	29
	2.1	Preparation	29
	2.1.1	Power Supply Voltages	29
	2.1.2	Diagnostic Test Mode	29
	2.1.3	Output Level Calibration	31
	2.1.4	Horizontal Output	31
	2.1.5	Harmonic Output	31
	2.1.6	1855 Dip Shunt Calibration Procedure	32

CONTENTS

			PAGE
SECTION	3	1865 Calibration Procedure	34
	3.1	Preparation	34
	3.1.1	Power Supply Adjustments	34
	3.1.2	Low Battery Adjustments	36
	3.1.3	CRT	36
	3.1.4	M119	36
	3.1.5	Frequency Adjustment	37
	3.1.6	Gain Adjustment	37
	3.1.7	Timing Adjustments	37
SECTION	4	Trouble Shooting	38-40
SECTION	5	Parts Lists 1855B	41-63
SECTION	6	Parts Lists 1865B	65-100
SECTION	7	Optional Equipment Parts List	101-144
SECTION	8	Schematic List & Drawings	

SECTION I

1855/1865 THEORY OF OPERATION

This section sets forth general and specific information on the principles of operation of the Models 1855/1865 Sweep Recovery System. Reference to the schematic section will facilitate understanding of the detailed individual assembly sections of this chapter.

1.1 Model 1855 Transmitter

At power-on, default values of sweep parameters are copied from read-only memory into the random-access memory of the 6802 microprocessor. The microprocessor sends the parameters byte by byte to the Latch Card, which makes them available in parallel to the digital-to-analog converters on the Ramp Card.

The Ramp Card provides voltages for the M9L-1 Sweep Oscillator. The microprocessor sends sweep parameters (start frequency, sweep width, sweep time, and repetition interval, plus parity and checksum) in serial ASCII to the M135 Phase-Shift Keying Modulator, which generates and phase-modulates the 50MHz pilot carrier. The information is made available simultaneously as TTL levels at the TTL output jack on the rear panel of the Model 1855.

After sweep parameters are transmitted, the Model 1855 transmits on the pilot carrier two 100 µsec pulses, designated "pass one" and "pass two", separated by an interval equal to one TV frame (33.3667 msec ±1 µsec for U.S. standards). The RF sweep is activated by the pass-two pulse.

Before the sweep, the start frequency, counted down by M138, is referred to an IC counter on the Microprocessor Card. After the sweep, the stop frequency is counted. The frequency counts are compared to the stored parameter values for F-1 and F-2; frequency and span are corrected as necessary.

The sequence consisting of parameter transmission, pass-one pulse, pass-two pulse, counting, sweep, and counting is repeated at intervals set by the value of the REP/SEC parameter.

Between sweeps the microprocessor scans the keyboard. When a numeric key is pressed, the microprocessor checks a "numeric entry" flag. If the flag is not set, the microprocessor sets the flag, clears the display (turning off parameter identification and units lights), and puts the new digit into the display. If the flag was already set, the microprocessor shifts the number in the display left one place and adds the new digit. If there are three digits to the left or one to the right of the decimal point, numeric keys are ignored.

When a parameter key is pressed, the microprocessor again checks the numeric-entry flag. If it is set, the number in the display is checked against the validity limits. If the number passes, it is stored as the new value of the parameter. If not, the microprocessor flashes the display briefly and then displays the current value of the parameter. In either case parameter identification and unit lights are turned on. If the flag is not set, the current value of the parameter is displayed.

If the flag is set when the CLEAR ENTRY key is pressed, the flag is cleared and the display reverts to its condition before the numeric entry. If the flag is not set, the CLEAR ENTRY key has no effect.

Pressing the CATV/CS key toggles the mode. In Continuous Sweep (CS) mode the interval between the end of one sweep and the beginning of the next is 1 msec. After a time specified by the value of REP/Sec, the unit pauses 50 msec to count then correct start and span frequencies. IF F-1 and F-2 are equal, the unit is put into CW mode. The frequency is counted and corrected at intervals specified by REP/SEC.

1.2 Model 1865 Sweep Analyzer

The 50MHz pilot carrier from the Model 1855 Transmitter is demodulated by the M119 Phase-Shift Keying Detector. The 1802 microprocessor stores the sweep parameters.

When the pass-one pulse is received, the Model 1865 activates "HOLD" in the M118 Biased Detector. The analog-to-digital converter begins to convert voltage levels into eight-bit binary numbers, with a range of 0-255 decimal

(256 possible values). The A/D converter is clocked at a rate such that 250 measurements will be made during the sweep.

Successive numbers are stored in consecutive locations of the main display memory. Pass one consists only of the video on the line.

As pass two, video plus sweep, is being received, the numbers in display memory are retrieved at the sampling rate and converted to an analog voltage. This voltage is subtracted from the pass two voltage. The difference is digitized and replaces the pass one voltages in the display memory. The result, to the extent that the video is the same on pass one and pass two, is that the display memory contains only the system response to the sweep frequencies.

After pass two is received the microprocessor inhibits Power Supply boards 2, 3, and 4, removing power from circuits not needed. After a time nearly equal to REP/SEC, the power supplies are disinhibited, readying the circuits for the next sweep.

Between sweeps the microprocessor scans the keyboard and refreshes the display. When the keyboard is found to be indicating a key pressed, the microprocessor identifies the key and after a debouncing confirmation takes appropriate action. Identification of the closed key is skipped as long as any key remains closed. Thus the sequence "hold ↑, hold ↓, and release ↑" will result in the cursor continuing to move upward, since the microprocessor will not check the identity of the closed key until it has found all keys open.

Raster scan of the CRT is bottom-to-top and left-to-right. At horizontal retrace, the beginning of a new refresh, a counter is zeroed. This counter is incremented at each vertical retrace, counting the vertical lines. As an upward scan approaches the baseline of the display, after painting a column of dots in the alphanumeric readout, the line counter is used as a pointer to the display memory. The number in memory (the digital representation of a sample from the M118 Biased Detector) initializes a counter. As the scan crosses the baseline, the beam is turned on and the counter begins to be decremented at a rate such that there are 256 counts by the time the scan reaches a point near the top of the screen. When the counter reaches zero, the beam is turned off. The result is a line whose height is proportional to the detected voltage. As the scan proceeds horizontally, it displays all the 250 sample points.

Cursors are generated in the same way as data display. Each cursor is defined by a position (a number from 0 to 255), and a mode. When ↑ or ↓ is pressed, the microprocessor increases or decreases the value of the position of the active cursor. If a cursor is in LEVEL mode its value initializes one of two cursor counters when the scan crosses the baseline. The counter is decremented at the same rate as the counter containing the sample voltage. When the count reaches zero, the intensity of the beam is enhanced for one dot time. This repeats with each vertical scan resulting in a horizontal row of dots.

For a cursor in FREQ mode the cursor counter is initialized at horizontal retrace and decremented at vertical retrace. When the counter reaches zero, the beam intensity is enhanced for a full vertical scan. The result is a line whose position on the display corresponds to the position of one of the sweep samples.

Graticule lines are generated by discrete logic clocked at the same rates as the counters for data and cursors.

Alphanumeric information is calculated from cursor positions and numbers in display memory. For a cursor in LEVEL mode, the microprocessor uses the cursor position to consult a table containing a piecewise-linear approximation to a logarithmic curve. If the cursor position does not correspond to one of the points in the table, the microprocessor interpolates between points. The microprocessor reads the setting of the ATTENUATION controls before each refresh and adds the value to the result of the table lookup. The result is the absolute line level, in dBmV, of a point at cursor height on the display.

The frequency to which a cursor in FREQ mode corresponds is calculated from

$$F = F\text{-}1 + N(S/250)$$

where F-1 is the start frequency, N the cursor position, and S the sweep width. S/250 is the amount by which the sweep frequency increases from one sample time to the next. The number in memory location N is run through the level calculation, yielding the level of the actual response at frequency F. The use of digital information for display generation and alphanumeric calculation ensures that optical distortions in the CRT give no effect on analysis of the display.

1.2.1 AVG Mode

The AVG function is an exponential smoothing operation, replacing a portion of the moving average with the same portion of the most recent input. The calculation operates on each sample value in B (auxiliary) memory, replacing the value with a value equal to 0.75B + 0.25A where B is the value in B memory (from the previous average) and A is the value in A memory (from the most recent sweep).

As a numerical example, suppose that the sample voltage at a particular frequency has been 25mV for some time. When AVG is pressed, the A memory is copied to the B memory. As long as the sample voltage at the frequency does not change, the averaging is:

$$0.75B + 0.25A = 0.75\ (25) + 0.25\ (25) = 18.75 + 6.25 = 25$$

and the average does not change.

If the sample voltage at the frequency jumps to 28mV, the average begins to follow the change.

After the first sweep following the increase, the updating is:

$$0.75\ (25) + 0.25\ (28) = 18.75 + 7.00 = 25.75$$

After the next sweep the average becomes:

$$0.75\ (25.75) + 0.25\ (28) = 19.31 + 7.00 = 26.31$$

By the tenth sweep after the increase the average has risen to 27.83mV. (See Figure 4-2.) If on the eleventh sweep the sample voltage returns to 25mV, the averaging is:

$$0.75\ (27.83) + 0.25\ (25) = 20.87 + 6.25 = 27.12$$

On the twelfth sweep:

$$0.75\ (27.12) + 0.25\ (25) = 20.34 + 6.25 = 26.59$$

By the twentieth sweep after the original increase the average is down to 25.16mV.

1.3 Model 1855 Transmitter Individual Assemblies

1.3.1 Front Panel Board

The front panel board contains the keyboard and LED displays. The keyboard consists of Hall-effect switches, each of which contains an IC to achieve bounceless levels. When the microprocessor wants to scan the keyboard, it lowers P101 pin 9, KEYS, enabling IC107 to pass address levels via closed keys to the data bus.

DS101 through DS104 are seven-segment LED's, which are driven by decoder/driver/latches IC103 through IC106 respectively. Latches are loaded in pairs; the microprocessor puts two four-bit bytes on the data bus, and lowers P101 pin 7, DISPØ, to load them into IC103 and IC104, or P101 pin 8, DISP1, to load IC105 and IC106.

Parameter indicators CR103 through CR115 are lit by Q101 through Q109, driven by bits from hex D flip-flops IC101 and IC102. LATCHØ loads IC102 loads IC102; LATCH1 loads IC101. Both "F-1" and "F-2" light "MHz" via CR101 or CR102.
Q110 lights the decimal point.

1.3.2 Microprocessor Card

The Microprocessor Card contains the microprocessor, read-only memory (ROM), support, and interface circuitry.

The microprocessor, IC201, is a 6802. X201 is the 4MHz crystal. The E output, IC201 pin 7, is a 1MHz system clock. J203 brings the E output to the bus if it is needed for an option. (J203 should not be installed if it is not required.)

The 6802 contains 126 bytes of random-access memory (RAM) on the chip; 32 of these retain data when main power is removed, if +5V is applied to pin 35. These locations are used in the Model 1855 to hold sweep parameters. The optional M152 Battery Backup supplies the holding voltage. DIP JUMPER 204 may be replaced with a plug wired to manipulate the data bus for test purposes.

IC203 and IC204 are one of eight decoders. A combination of bits on selector pins 1, 2, and 3, in conjunction with the VMA (Valid Memory Address) signal and clock pulse E from the microprocessor, causes one of the output pins to go low, enabling the corresponding IC to interact with the microprocessor.

ROM 0 and ROM 1 contain the program.

IC207 is a Programmable Timing Module (PTM), containing registers which may be used to count frequencies, or, by counting system clock pulses, to produce time intervals. The PTM counts the output of the M138 Counter and reports the results to the microprocessor; it provides pulses for the Serial Data Out to the M135 PSK Modulator; and it times the sweep repetition interval.

IC208 is an inverting input buffer. When it is enabled, the factory-set wiring of DIP JUMPER 206 gives to the microprocessor a correction factor for the frequency of X201. This results in more stable operation than pulling crystal frequency with a trimmer capacitor.

IC213 and IC214 are three-start buffers for address lines. IC212 is a bi-directional, three-state buffer for the data bus. IC212 through IC214 are enabled when all the lines on IC110 are high.

IC209 with associated circuitry is a power-on reset and power-failure monitor. At power on while the +9V unregulated is below the voltage necessary for +5V regulator IC211, IC209A pin 1 is low. Q202 conducts, holding IC209 pin 5 and RESET low. When the +9V reaches the threshold, A202 is cut off, allowing C212 to charge through R220. After about 0.1 seconds RESET goes high, allowing the microprocessor to proceed.

If the optional M152 Battery Backup is installed and turned on when the +9 falls below the threshold, Q202 is turned on, discharging C212 and bring RESET low immediately. C210 and C211 keep the main +5V up long enough to allow the microprocessor to power down gracefully. A fully-charged M152 will keep the sweep parameters in RAM for about 24 hours.

When the +9V again exceeds the threshold, Q202 again holds RESET low for 0.2 seconds. When RESET is released, the microprocessor calculates a checksum from the sweep parameters in its RAM. It compares this with the RAM checksum that is calculated when a parameter is changed. If the two checksums do not agree, the microprocessor loads the default parameters from ROM.

1.3.3 Latch Card

The Latch Card takes data from the Microprocessor Card and makes them available to the Ramp Card.

Address lines from the microprocessor, in conjunction with enable line E8, select one of the latches IC402 - IC408 to hold the byte from the data bus.

When the microprocessor has signaled RAMP DOWN in Continuous Sweep mode, ZERO from the Ramp Card produces RESET and brings RAMP high. (See Section 1.3.4, Ramp Card, for the use of these signals.)

1.3.4 Ramp Card

The Ramp Card contains digital-to-analog converters (DACs) which convert digital information from the Latch Card to analog voltages which control the sweep.

Start frequency is determined by the digital settings of IC513 and IC514. These are programmable current sources; currents are converted to voltages by IC515 and IC516. The two voltages are summed by IC519. The ratios of input and feedback resistances of IC515, IC516, and IC519 are such that the voltage change at IC519 pin 6 due to an increment of current from IC513 is 64 times as great as the change due to the same increment from IC514. Thus each of the 256 steps from IC513 can be divided into 64 parts by adding steps from IC514. The result is that the voltage range is divided into 256 x 64 = 16,284 increments, equivalent to a 14-bit DAC. Dividing the nominal 400MHz frequency range by this value gives 24.4 kHz per increment; the actual frequency range is adjusted so that each increment of current steps the frequency 25kHz.

Sweep time is determined by IC501. The voltage from IC503 is integrated by C505, producing a ramp that rises from 0 to 10V in a time determined by the magnitude of the current. The output of IC501 is logarithmically related to the binary input, to compensate for the non-linear relationship between the magnitude of the current and the charging time of C505.

IC504 and IC505 determine frequency span. These DACs are linked in the same manner as IC513 and IC514. The ramp output of IC503 is the reference for IC504 and IC505; the output of IC507 is the ramp voltage multiplied by the binary fraction on the input pins of the DACs. In other words, the DACs divide the reference into 16,384 increments, and output as many increments as the binary programming needs. The reference is a ramp from 0 to 10V; the output is a ramp from zero to some lower voltage.

The ramp voltage is added to the start voltage in IC519. The resulting ramp causes the M9L-1 Sweep Oscillator to sweep from the start frequency to the start frequency plus the span.

Assume that a voltage of 0V on the sweep oscillator produces a frequency of 0MHz, and that 10V produces 400MHz. Then sweeping from 50 to 250MHz requires a voltage sweep from 1.25V to 6.25V. The START DAC outputs current to produce 1.25V; the SPAN DAC divides the 0-10V ramp to 0-5.0V. The sum of the two outputs is a ramp from 1.25-6.25V.

At the end of each sweep the microprocessor brings RESET high. (This is not the same as RESET on the microprocessor card.) The analog switch between IC502 pins 2 and 3 opens and C505 holds its voltage while the stop frequency is counted.

At the end of the sweep in CATV mode, the microprocessor raises the BLANKING line via IC404 pin 11 of the latch card cutting off the sweep output. RAMP is asserted, closing the analog switch between IC502 pins 6 and 7. C505 discharges, ready for the next sweep. In Continuous Sweep (CS) mode the microprocessor signals RAMP DOWN rather than RAMP at the end of the sweep, closing the switch between IC502 pins 14 and 15. This puts a negative voltage on IC503 pin 6 causing C505 to discharge in 1 msec. The frequency ramps down to the start, producing a baseline for an oscilloscope display.

When the ramp voltage falls below the 0.15V, established by R527 and R530, ZERO goes low, causing IC410 on the latch card to send RAMP low, discharging C505. This prevents the sweep voltage from going negative.

In CW mode the RAMP is low, closing IC502 pins 6 and 7. No integrating occurs, so there is no ramp, and the output frequency remains constant. IC511 and IC512A provide a voltage which biases PIN diode attenuators in various modules to provide the proper output level.

IC512B adds a small amount of sweep voltage, variable by the TILT control, to the LEVEL program to change the amplitude as frequency changes.

1.3.5 M9L-1 Oscillator-Mixer

The M9L-1 produces the RF sweep output. The module contains two UHF oscillators sweeping in opposite directions. The difference between their frequencies is the output.

The oscillator formed by Q2 sweeps from 1550 to 1750MHz. The bias on the anodes of voltage-variable capacitance diodes CR1, CR2, and CR3 is adjusted by R3 to achieve proper calibration. The sweep voltage from the ramp card is applied to the cathodes of the diodes. The diodes associated with Q10 are reversed, and the polarity of the bias voltage is opposite, so the sweep is from 1550 down to 1350MHz.

The sweeps are combined in a single-balanced diode mixer composed of L4, L11, CR4, and CR5. The difference frequency, 1 to 400MHz, is amplified by Q3, Q5, and Q6.

This double-acting sweep allows greater frequency range, and achieves partial cancellation of nonlinearities in the frequency-versus-voltage characteristics of the oscillators. R9 maximizes this cancellation by varying the drive ratio between the two oscillators.

In CW mode, a voltage is applied to pin 7 of the module, turning Q14 on and connecting C34 and L13 to ground as a series filter on the DC control line.

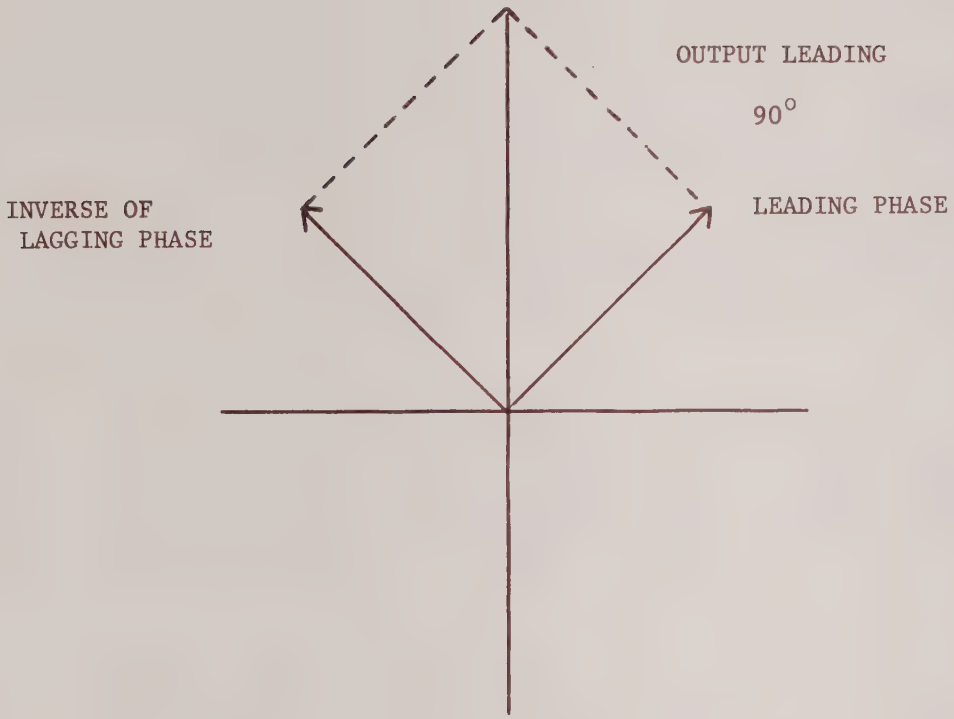


Figure 1-1. M135 OUTPUT LEADING REFERENCE 90°

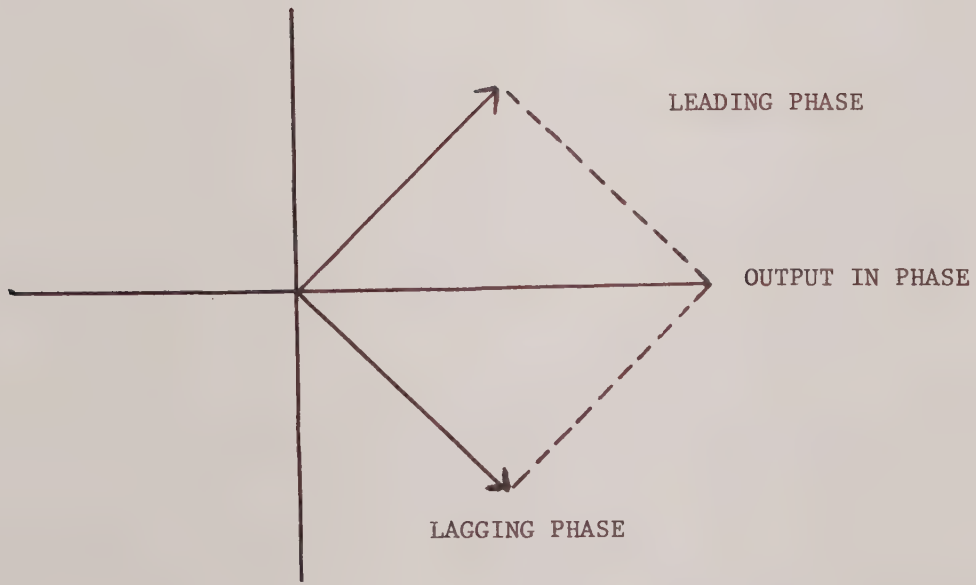


Figure 1-2. M135 OUTPUT IN PHASE WITH REFERENCE

1.3.6 M135 PSK Modulator

The M135 generates the 50MHz pilot carrier and shifts its phase 90° when so ordered by serial data from the microprocessor board.

Q5 and X1 generate the 50MHz carrier. One output of hybrid splitter T1 goes to a low-pass filter, L10 and C26; the other output goes to a high-pass filter, C14 and L13.

The output of the mixer is linearly combined with the leading phase from the low-pass filter. When the TTL level is high, the lagging phase is combined with the leading phase, giving a signal that is in phase with the reference; when the TTL level is low, the inverse of the lagging phase is used, resulting in an output that leads the reference by 90°.

Figures 4-1 and 4-2 show vector diagrams for this process. The phase-modulated signal is amplified by Q6. Level control is provided by IC1. A sample of the signal is rectified by CR2 and CR3, and compared with the level voltage from the analog card. The difference voltage produces a current which biases PIN diodes CR4 and CR5, providing proper attenuation for the signal.

1.3.7 M138 Loop Counter

The M138 divides the sweep frequency by 160, passing the output to the programmable timing module (PTM) on the microprocessor card.

The RF input is clamped by forward-biased diode bridge CR1 through CR4. IC2 is an ECL prescaler, dividing by 10. IC3 divides by 16.

1.3.8 DPS10 Power Supply

S1 is the rear-panel line voltage switch, connecting the primaries of T1 in parallel for 115 VAC or in series for 230 VAC.

The ±18V supplies are regulated by power Darlingtons Q3 and Q4. IC1 provides the reference for the +18 supply.

If the output voltages starts to drop, the voltage at IC2 pin 2 falls. The difference between IC2 pins 3 and 2 increases, so the output of IC2 increases. More current flows into the base of Q3, turning it on harder and decreasing the voltage drop. Q1 supplies current limiting.

The -18V supply is referenced to ground; the feedback circuitry attempts to keep the wiper of R8 at zero volts. This allows the two supplies to track with temperature.

The +9V unregulated is taken from P1 pins 3 and 4. The +9V supply from P1 pins 1 and 2 are used only if options are installed which require unusual amounts of current. P2 pin 5 is connected to P2 pin 7 in order to take advantage of the filtering available from C10.

CAUTION

When the unit is shipped, one of the blue wires from power transformer T1 is connected to J1 pin 9, as shown on the schematic. P1 has only seven pins, so this wire floats. The wire should not be moved to J1 pin 1 unless the factory so advises. If the extra current is not needed, the increased voltage from the 9V supply might cause the Model 1855 to overheat.

1.3.9 M113 Selective Blanking Option

The inverted combined program at module pin 2 is the sum of the offset and ramp voltages from the ramp card. It sweeps from +10V to -10V, and is biased at the junction of R2 and R3 by the voltage from R4. When the biased sweep voltage is above the 9V reference at IC1A pin 5 (from the junction of R5 and R6) the output of IC1A is low. The output of IC1B is high. Q1 is off, so Q3 is off, and the blanking voltage at module pin 3 is zero. As the sweep voltage (biased by R4) falls, the output frequency rises; when the sweep voltage falls below the level set by R5/R6, the output of the IC1A goes positive, turning Q1 on. Q3 turns on, and module pin 3 goes to about +17V. Thus, R4 sets the lower edge of the blanking interval.

When the biased sweep voltage reaches the level set by R8, the output of IC1B goes low, turning Q1 and Q3 off, returning the blanking voltage to zero.

The operation of the second blanking interval is identical. R13 sets the leading edge of the interval; the trailing edge is set by R8.

1.4 1865 Receiver Individual Assemblies

1.4.1 M117 Amplifier/Programmable Attenuator

The M117 amplifies the RF input and supplies part of the attenuation called for by the front-panel controls. The two wide-band amplifiers, consisting of Q101 through Q104 and Q201 through Q204, are identical, each providing approximately 24dB gain, flat to 400MHz. (450MHz for B units.)

Attenuators of 0, 10, or 20dB may be inserted between the amplifiers by applying voltages to module pins. The 0dB path is selected by applying a TTL high voltage to IC402 pin 3. Pin 2 is biased to approximately +3 volts by R407 and R408; when pin 3 is low, this positive voltage on the inverting input drives the output negative, reverse-biasing CR302 and CR305. A high on pin 3 drives the output positive, turning CR302 and CR305 on, allowing DC current with RF superimposed, to flow.

A high on the 10dB line, IC401 pin 3, turns on CR301 and CR304, allowing current to flow through R308, which, in conjunction with R306 and R307, forms a 10dB pi-section attenuator. The 20dB attenuator, R311, R309, R310, is switched in a similar manner. The front-panel switching is such that only one path at a time is selected.

The RF input to the Model 1865 goes first to the 1-10dB turret attenuator behind the front panel, then to the 10-70dB turret. When this turret is set to 0, 10, or 20dB it programs the M117 for that attenuation and feeds the signal directly to the module. At higher settings the attenuation of the turret is 20dB less than the setting; the attenuation in the M117 stays at 20dB, maximizing the signal to noise and dynamic range of the two amplifiers.

1.4.2 M118 Differential Biased Detector

The M118 detects the incoming RF signal from the M117 programmable attenuator. T1 converts the 75ohm unbalanced input to 75ohm balanced, and provides a tap output.

Where there is no input, IC1 pin 2 is biased near zero. On negative half cycles current flows through R3 and CR2, charging C2. On positive half cycles current flows through CR1; C2 discharges, adding its current. The resulting change of bias causes the output of IC1A to go negative. Negative half-cycles are treated similarly by the circuitry leading to IC1B pin 6. The diodes are biased in the linear portions of their characteristic curve.

The negative-going output of IC1A is algebraically subtracted from the positive-going output of IC1B in differential amplifier IC2A. The output of IC2A, always positive, is amplified by IC3 and IC4, which are connected as a low-pass amplifier which prevents the signal from changing too fast for the A-D converter (on the A-D/data memory card).

The output level, divided in half by R37 and R36, is fed to the comparator, IC2B. IC2B pin 5 is biased at 0.9 volts by R35. When the HOLD pulse is absent IC5 pins 2 and 3 are connected, feeding the difference between the output and the 2V reference back to IC2A, through Q3 and Q2. When the HOLD pulse arrives from the A/D card the switch between IC5 pins 2 and 3 is opened. C12 holds the feedback constant; the output is now added to the 2V bias level.

When S1, a mechanical switch on the module housing, is in manual, the switch between IC5 pins 14 and 15 is opened, removing the feedback entirely. This allows the balancing of IC2A by means of R23.

1.4.3 M119 PSK Detector

The M119 recovers sweep-parameter modulation from the 50MHz phase-shifted carrier.

The 50MHz carrier is filtered from the sweep by a band-pass amplifier consisting of Q101 and Q102. The output is mixed in MX1 with the output of the 46.42MHz voltage-controlled oscillator (VCO), which consists of Q201 and associated circuitry. CR201, a voltage-variable capacitor, resonates with L203 and L204.

The 3.58MHz output of MX1 is amplified by Q301 and IC301. The gain of the combination is greater than 60dB, resulting in a saturated output even for low input level. This is limited to TTL levels by Q302. The square-wave output of Q302 is one input to the phase detector, IC203; the other input is the 3.58MHz reference frequency from the timing card.

As the carrier phase begins to shift in a leading direction, the phase detector raises its output voltage, amplified and filtered by IC303A, which tends to raise the frequency of the VCO. As the VCO frequency begins to increase its cycles arrive earlier, causing the phase difference between the VCO and the input carrier to approach its previous value. This brings the phase-detector output voltage toward its previous value. The VCO thus returns to its previous frequency, but it is now shifted forward in phase to keep up with the carrier. A lagging shift in carrier phase has the opposite effect.

These pulses in the phase-detector output voltage are amplified by IC303B. Positive-going pulses are steered by CR302 to pin 2 of flip-flop IC304; negative-going pulses are steered to IC304 pin 6.

At power-on, IC304 pin 11 may latch either high or low. Assume it to be low; then pin 4 is high. Pin 1 is tied high; pin 2 is low, so 3 is high. Pins 12 and 13 are both high, holding 11 and 5 low. A positive-going pulse brings pin 2 high for a short time. Pin 3 goes low, driving pin 11 high. Pins 4 and 12 go low, holding pin 11 high. When pin 11 is high, a positive pulse has no effect because pin 12 is low, and pin 13 has no effect on pin 11.

When pin 11 is high, a negative-going pulse is steered by CR303 to IC304 pin 6, bringing pin 4 high. Pin 13 is high, so pin 11 latches low.

1.4.4 Model 1865 Vertical/Horizontal Timing Card

The vertical/horizontal timing card supplies sync pulses and video information to the CRT.

Most timing functions are controlled by the timing control PROM, IC102. The vertical counter, consisting of IC101, IC103, and IC104, is set to zero during

the vertical sync pulse, and incremented by the 7.16MHz clock, IC118. Outputs from the counter are connected to the address lines of the PROM, selecting a new location with each clock tick. Output lines from the PROM go to latches IC105 and IC106. The latches are loaded by pulses from the 7.16MHz clock; inputs from the timing control PROM appear at latch outputs one clock pulse after they appear at the inputs to the PROM.

Outputs from the latches are used as system control signals. Each locations in the PROM contains a binary number whose bit pattern consists of the logic levels necessary to put the system into the proper state at each clock time.

The vertical sweep of the beam may be divided into three parts: dead time during which the beam is always off; alphanumeric, or A/N time, during which alphanumeric characters are painted on the screen; and display time, during which data, cursors, and grid lines are produced.

The Vertical clock begins to count at the end of the vertical sync pulse. The first fourteen ticks are dead time, allowing the beam to clear the bottom of the screen.

Line 4, A/N character, defines A/N time. It goes high at time 15 and is made available on the complementary output of the latch as ALPHA CHARACTER. Line 3, 1st ALPHA CHARACTER, goes high at the same time, switching the character selector, IC120 and IC121, to the inputs for the character for the display line labeled "M2" or "M2-M1". The two characters for the current sweep are held in latches on the control register card.

Characters are defined on a 7 x 7 dot matrix. Locations in the character generator PROM contain the bit patterns to generate dots (beam on) and no dots (beam off) to paint one column of a character. Each character is allocated eight locations; the eighth column of each character and the eighth position of each column are no dots, to provide spacing between lines and characters.

The character comes from the latches as a six-bit ASCII representation, which is used as the high-order portion of the nine-bit address of the character generator, selecting a block of eight columns. The lower three bits are

supplied by the column selector, IC116. This counter is loaded by the horizontal sync pulse or by its own overflow. It is clocked by the vertical sync pulse. The load value is 8 (decimal); since only the three low-order output bits are used, counting from 8 to 15 is equivalent to counting from 0 to 7.

The bit pattern for the selected column goes to row selector IC117. This is a one-of-eight data selector enabled by ALPHA-CHARACTER. A bit is selected by bits 1, 2, and 3 or the vertical counter. Since bit 1 of the counter toggles at half the clock rate, each dot is two clock ticks high.

The output of the row selector is inverted by IC113 becoming ALPHA-NUMERIC OUT, which drives the base of Q102. When ALPHA-NUMERIC OUT is high, the PNP transistor is off; when the line goes low, the transistor turns on causing current to flow to the video drive circuitry of the CRT module. R118 controls the current through Q102, hence the relative brightness of the alphanumeric portion of the display.

1st ALPHA CHARACTER goes low at time 31, selecting the character for line M1. Character generation is the same. The column selector is incremented by the vertical sync pulse; when it reaches its maximum count, the ripple-carry output goes high, reloading the counter and requesting the microprocessor to load two more characters into the latches.

A/N time ends at time 47 when A/N CHARACTER, output 4 of timing control goes low. ALPHA-CHARACTER goes high disabling IC117. Its output goes low sending ALPHA-NUMERIC OUT high, and holding Q102 off. IC117 continues to select rows of the current column, but they have no effect on the output.

Display time begins at time 47 when line 1, INTENSITY PROM ENABLE, goes high, the complementary output of the latch goes low, selecting the intensity control PROM, IC100. The other select input is connected to the complement of HORZ RETRACE and is active except during horizontal retrace.

Address inputs to intensity control are status lines (dot/line display, LEVEL/FREQ for each cursor, and requests for display of data, cursors, and grid lines.) Each location contains a bit pattern which turns on one (and only one) of the intensity-control transistors Q101 and Q103 through Q109. The logic that generated the bit patterns in the PROM established precedence as follows: If a cursor is requested at the same time as grid or data (i.e. for the same point on the screen) one of the cursor transistors (depending on cursor mode and display) is turned on, rather than grid or data transistors. Grid requests take precedence over data requests. The use of separate transistors for various combinations of display mode and cursor mode allows relative brightness of display elements to be adjusted for best display readability. Display time ends at time 305 when line 1, intensity control, goes low. Line 7 goes high at time 321, beginning the vertical sync pulse, and goes low at time 457. At time 456 a one-count pulse is produced which resets the vertical counter.

Horizontal sync is produced by the horizontal counter, IC107, IC108, and IC109, which is clocked by the beginning of the vertical sync pulse. The counter loads with a value of 5, so it is 251 counts (251 lines) later that it reaches 256 (decimal). On the next count IC109 pin 14 goes high, producing HORZ RETRACE at IC113 pin 2. IC107 is at a count of 1 at this time; when it reaches 9, 8 lines later, IC119 goes low, loading the counter and bringing HORZ RETRACE high again.

Horizontal grid lines are produced by line 6 of timing control, which produces a one-count pulse each 32 clock ticks during display time. When HORZ RETRACE is inactive, i.e. high, IC114 pin 4 is high. IC114 pin 5 is normally low, so IC114 pin 6 is high. IC112 pin 15 is normally low, so IC119 pin 11 is high. Thus both inputs of IC114 pins 12 and 13 are high, and IC114 pin 8 is high, so IC113 pin 8 is low. When GRID goes high, IC114 pin 6 goes low sending IC114 pin 11 high. IC114 pin 10 is high when IC101 pin 14 is low, every other clock pulse. IC101 pin 14 is the low-order bit in the clock time, so it is high on odd counts. The counts on which line 6 is high are odd, but the level appears at the output of the latch one clock pulse later, by which time IC101 pin 14 has gone low. Thus IC114 pin 3 is high. IC114 pin 8 is low, and IC113 pin 8 is high, requesting a grid output from intensity control.

Vertical grid lines are produced by the horizontal grid counter, consisting of IC111 and IC112. When HORZ RETRACE is high, the complement from IC113 pin 6 holds the A input of IC112 and the D input of IC111 low. All other inputs are tied high; the result is a start count of 231 (decimal). When the count, clocked by vertical sync, reaches 255, IC112 pin 14 goes high. When DATA LOAD goes high at the start of display time, IC119 pin 11 goes low, thus sending IC114 pin 11 high. On alternate clock counts IC114 pin 3 is high producing a series of pulses at IC114 pin 8, hence at the grid input to intensity control. The vertical line is chopped to make it comparable in intensity to the horizontal grid lines, which are also composed of dots. DATA LOAD goes low at time 303, shutting off the pulses. Counting from 321 to 255 produces a vertical line every 25 sweeps.

Production of grid lines is inhibited while HORZ RETRACE is low. IC113 pin 6 is high, forcing the reset of IC111 and IC112 to 255 (decimal). IC110 pin 9 is low so IC110 pin 10 is low, holding the counters at load. IC112 pin 15 is high, since the counters are at their maximum count.

When HORZ RETRACE goes high, the load value of the counters goes back to 232 (decimal). This value does not appear at the output until the next vertical sync pulse, so IC112 pin 15 is still high, holding IC110 pin 10 low and holding the counters at load. The display is now enabled so a line is produced during the time DATA LOAD is high. At the next vertical sync pulse the load value of 231 appears on the outputs of the counters. IC112 pin 15 goes low and counting resumes.

Cursors are produced by cursor generators IC126 and IC127 (for M1) and IC123 and IC124 (for M2). Cursor mode selectors IC125 (for M1) and IC122 (for M2) are four-of-eight data selectors which connect appropriate load and clock signals to the counters. When M1, for instance, is in LEVEL mode, the latch on the control register card holds IC125 pin 1 low, selecting the A inputs. DATA LOAD, line 5 from timing control, becomes DATA LOAD at the complementary out of the latch. In LEVEL mode this signal loads the counter with the value from the cursor 1 latch on the control register board. IC126 and IC127 are incremented by the vertical clock; when they reach 255 (decimal), IC127 pin 15 goes high for one tick, requesting a dot as part of the horizontal cursor. At the next

clock tick the counters overflow to zero and continue upward, but this is irrelevant, since only the output from IC127 pin 14 is used, and the counters are reloaded at the beginning of the next sweep.

The B inputs to the mode selectors are used for FREQ mode. Counters are loaded by HORZ RETRACE and clocked by vertical retrace. When the count reaches 255 (decimal), IC127 pin 15 goes high for one count, that is one sweep, producing a cursor request which will be honored while intensity control is enabled.

1.4.5 Control Register Card

The control register card contains latches which hand off data and status information to the vertical horizontal timing card. It contains circuitry to provide the variable clock for the A/D-data memory card, and provides signals for LINE and DOT modes to the timing card.

A pair of latches is selected by one of the I/O select bits N0, N1, or N2, in conjunction with address bit A0. To address IC201 and IC202, for example, the microprocessor executes the "Output to Port 1" instruction. N0 is high when MRD goes low. IC216 pin 3 goes low, activating one of the enable inputs on the latches. The other enable is connected by A0, which was set during the Fetch portion of the cycle when the byte to be output was read from memory. Thus it is seen that the number for cursor 1 must be stored in an even-address memory location, so that A0 will be low. Cursor 2 is set by outputting to port 1 from an odd location. Writing to port 2 from an even location enables IC205 and IC206 and so on. Timing pulse TPB strobes the byte into the latches.

A four-bit byte in IC212 sets the timing factor for the variable clock. This number presets IC214, which counts up to 15 (decimal). While the count is less than 15 the ripple-carry output, IC214 pin 15, is low, causing flipflop IC213 to hold its present state. The the count reaches 15, RC goes high, allowing IC213 to toggle on the next clock pulse. Thus IC214 times halfcycles of a symmetrical output from IC213.

A data line or dot on the display is produced by loading a value from RAM into latches IC223 and IC224. This is accomplished via Direct Memory Access (DMA), as follows: HORZ RETRACE is high during display generation, VERTICAL SYNC goes

low at the end of the upward sweep, sending IC220 pin 6 high. At the end of the vertical sync time VERTICAL SYNC goes high, sending IC220 pin 6 low, clocking a high level to the Q output of IC221. IC210 pin 4 is high, so DMA OUT goes low, requesting a DMA output from the microprocessor. The microprocessor has an interval address register which points to the location of the next data value. This address is put on the address bus and MRD is brought high low, putting the byte on the data bus. This is the value from a conversion by the A D/Memory board of an output from the M118 biased detector. When the microprocessor has done this, it sets S1 (P3-19) high and S0 (P3-17) low, indicating a DMA state. This combination clocks the data value into latches IC223 and IC224, and resets IC221.

DATA LOAD from the timing card holds counters IC222 and IC225 at LOAD while the CRT beam is painting characters. When the DATA LOAD goes high, control of the beam passes to data circuitry. IC222 and IC225 begin to count down from the load value given them from data memory. When the count passes through zero, RC (IC222 pin 15) goes low for one count. DOT DATA (IC220 pin 11) goes low, signalling the intensity control PROM on the timing card to turn the beam on for one count, its DOT mode is in effect.

1.4.6 1865 Microprocessor Card

The microprocessor card contains the microprocessor, support and interface chips.

The microprocessor is a CDP1802DC, an eight-bit statis CMOS part. With two exceptions, pins designated active high (no bar) are inputs. The exceptions are MRD and MWR. (The data bus is bidirectional.)

A sixteen-bit address is put on the eight-bit-wide address bus as two eight-bit bytes. Timing pulse TPA is raised when the first byte is on the bus; this latches the byte into IC302 and IC303. High-order address bits go to IC301, a one-of-eight decoder, which selects ROM, RAM, or keyboard. ROM2 is installed only if card reader option is installed.

R303 and C301 perform power-on reset.

The test socket (DATA bus ports of microprocessor) normally contains a DIP plug which connects the data bus to the data I/O pins on the microprocessor. When the test plug is substituted for the standard plug, some bits are open pulled up by R308; others are held at ground. The result is that every instruction fetch sees the code for NOP (no operation). This causes the microprocessor to fetch the next instruction, which is also NOP. Continuing, the microprocessor cycles through all the addresses. This feature is used for signature analysis.

IC306 is a universal asynchronous receiver-transmitter (UART), used to convert the serial bits from the M119 PSK Demodulator into parallel bytes.

Information on the six low-order address bits is always made available to the keyboard via IC304. When the microprocessor wants to scan the keyboard, IC301 selects the three-state inverter IC305, which passes levels from closed keys to the data bus.

IC311 and IC312 divide the clock frequency by 372 for the UART.

1.4.7 Model 1865 A-D Data Memory Card

The A-D/memory card measures voltages from the M118 biased detector, expressing the results as eight-bit binary numbers which are stored for use by the display circuitry and the microprocessor. On pass 1 the Model 1855 Transmitter sends sweep parameters and a trigger pulse, but no sweep; the Model 1865 measures the voltage of sync and video on the cable. On pass 2, one TV frame later, the sweep is sent. The A-D card subtracts the pass 1 voltage as it measures pass 2; since the sync signals are the same in this frame, and the video nearly the same, the result of the pass 2 measurement is the sweep voltage only.

Pilot-carrier information from the M119 PSK Demodulator comes to IC402 pin 11, and is passed via P7 pin 46 to the UART on the Microprocessor Card. The Q output of the microprocessor has been low between sweeps, holding IC414 and IC415 at LOAD. The load value is the maximum count, so IC414 pin 15 is high, which holds IC402 pin 4, INPUT ENABLE, low. This disables IC410, which provides various clock signals during the conversion.

When the microprocessor has stored the sweep parameters and verified the checksum, it brings Q high. This allows IC412 pin 2 to pass the triggering pulse from the pilot carrier. This pulse is positive-going, so it triggers IC423 at pin 2. This one-shot brings IC414 pin 1 and IC415 pin 1 low for approximately 20 µsec, setting the counter outputs to zero. IC414 pin 15 goes low, raising INPUT ENABLE. The trailing edge of the trigger pulse triggers IC423 at pin 9. The output will stay high for about 80 msec, somewhat longer than one TV frame time. IC410 is connected as a shift register. Pin 1, the CLEAR input, has been low; when it goes high, the variable clock at pin 9 causes the level at the D2 input (pin 4) to pass to the Q2 output (pin 5). This input is the inverse of CC (Conversion Complete), which has been low; the result is that C1, C2, C3, C4, and Q1 go high on successive clock transitions. The upward transition of C3 would clock IC414 and IC415, except that the CLEAR pulse from IC423 is still present. (R426 adjusts the pulse width so that this is the case.) When Q1 (IC410 pin 2) goes low SC (Start Conversion) goes low, signalling the analog-to-digital conversion circuitry to commence measuring the output of the M118.

IC407 is a digital-to-analog converter (DAC) which sinks a current proportional to the binary number on its input lines. IC406 produces a reference current; each of the eight DAC input pins switches a portion of the reference.

Bit 7, the most significant bit (MSB) switches 2^{-1}, or 1/2 times the reference current; bit 6 switches 2^{-2} or 1/4, etc. Bit 0, the least significant bit (LSB), switches 2^{-8} or 1/256 times the reference. When all switches are on, the current is 255/256 times the reference.

The voltage from the M118 biased detector produces a current through R403 into the summing node at the inverting input of the comparator, IC408. If the current out of the node into the DAC is greater, the difference flows into the node through R405, putting the node below ground and causing the output of the comparator to be positive. If the DC current is less than the M118 current, the difference flows out, and the comparator output is negative. The successive approximation register (SAR) tries each switch in turn, starting with the MSB, and uses the comparator output to decide whether to keep the switch closed or open it. After the eighth increment (switched by the LSB) has been tested, the current into the DAC is the best possible approximation to the current from the M118. (That is, the current through R405 is minimized.)

After the LSB has been tried, the SAR brings CC low, which causes a high level to ripple from Q2 to Q1. C2 locks the binary number from the SAR into the data memory, IC416 and IC417. INPUT ENABLE has been allowing data selectors IC418 and IC419 to send the output of counters IC414 and IC415 to the address lines of the memory. C3 clocks the counters (the CLEAR from IC423 no longer objecting), and Q1 lowers SC to start the next conversion.

The SAR uses negative-true logic (0 = true, 1 = false); the I output of the SAR is used so that the current will behave correctly. The memory input drivers, portions of IC402, IC413, and IC422, invert the data from the SAR, so that the number is stored as positive-true.

After 256 conversions have been made IC414 and IC415 reach maximum count. IC414 pin 15 goes high bringing INPUT ENABLE low, which disables IC410. IC414 is clocked at pin 15, but PASS 1 is low, so the high of EF2 does not change.

The circuitry is now quiescent until the pass 2 trigger pulse arrives. When the trigger pulse arrives, the action proceeds as for pass 1, except that IC414 pin 3 clocks the high on pin 5 to pin 1, making PASS 1 high. This removes the CLEAR from latches IC403 and IC404; each time CC goes high the number from the memory location addressed by IC414 and IC415 is strobed to the inputs of the subtraction DAC, IC405. IC414 and IC415 point to the location into which the new conversion value is to go; the value currently in that location is the measurement from the same point in time during pass 1. This pass 1 value stays on the inputs of the subtraction DAC throughout the conversion. The subtraction DAC sinks a current due to the sweep voltage to be approximated by the PASS 1 DAC.

When the count reaches 256, IC414 pin 15 again goes high. This clocks IC424 at pin 11, sending the high on PASS 1 to pin 12. This is the Q output, so the high appears as a low, which is sent to EF2, one of the External Flag pins on the microprocessor. The microprocessor checks the status of this pin periodically; when it is low, the microprocessor brings its Q output low. This resets both halves of IC424, bring PASS 1 low and EF2 high, ready for the next sweep.

If the pass 2 trigger had been lost, IC423 pin 5 would have timed out after 40 msec, and the next trigger pulse would have been properly interpreted as pass 1.

1.4.8 CRT

The CRT module is a Motorola M1000-155 with modifications. The major change is the removal of the horizontal oscillator, since horizontal timing is done on the horizontal/vertical timing card. The deflection yoke is rotated 90° counterclockwise, to orient the raster scan properly.

R21, C47, and Q13 form a slow-turn-on circuit for the CRT filament. At power-on C47 has no charge, so the gate of Q13 is at ground and no current flows. As C47 charges through R21, Q13 gradually increases the filament current.

1.4.9 Power Supplies

Voltages other than +12 unregulated are supplied by switching regulators. Advantages include high efficiency and the availability of negative polarity and voltages higher than the battery. Refer to the schematic for power supplies 1 and 2. When the square-wave drive is high, Q1 is saturated, so the loss is very low. A magnetic field builds up around L1; C1 charges toward the battery voltage. When the drive goes low, Q1 cuts off. The collapsing magnetic field around L1 tries to keep the current flowing; this current flows through CR1. The discharge of C1 contributes current to the load. Output voltage is controlled by varying the duty cycle of the drive, and is set for +5 V.

The square-wave drive in the Model 1865 power supplies is provided by IC2. This special-purpose IC contains an oscillator whose frequency is controlled by C5 and R17 on cards 1 and 2, and a pulse-width modulator. The square wave from the oscillator is converted to a triangular wave, which is compared with the control voltage on IC2 pin 6. The output is high while the triangular wave is higher than the control voltage, low when the triangular wave is lower. Thus a higher voltage on pin 6 results in a shorter duty cycle on the output and a lower voltage from the regulator.

The output voltage is fed to IC1A pin 3, where it is compared with the reference voltage from IC2 pin 9, buffered by IC1B. If the load current increases, the output voltage decreases and the voltage on IC2 pin 6 decreases, increasing the duty cycle of the drive.

When the inhibit line is high, Q2 conducts bringing IC2 pin 14 low and shutting off the drive. The filter capacitors discharge, and the output voltage drops to zero.

C3, R9, Q1, and associated diodes form a "soft-start" circuit. When power is applied, C3 charges through R9 and CR3. As the decreasing current through R9 brings the voltage on IC2 pin 6 down from 12 volts, the output current increases proportionally.

When the voltage on pin 6 drops below the voltage on IC1A pin 1, CR1 conducts and CR3 turns off. The feedback is now in control of the output. When the inhibit line is brought high, the low voltage on the collector of Q2 turns Q1 on, discharging C3, ready for the next start.

Power supply card 3 provides a voltage higher than the supply (+20V). When Q1 conducts, current flows from the battery through L1 and Q1 to ground. When Q1 cuts off, the collapsing magnetic field of L1 forces current through CR1, charging C1. The voltage on C1 is determined by its capacitance and the amount of charge deposited by the current pulses. CR1 prevents C1 from discharging through Q1 when Q1 conducts.

IC2 pins 11 and 13 are separate outputs of the drive wave. On cards 1 and 2 they are tied together; on card 3 the second output, IC2 pin 13, drives a separate supply. The circuit is similar in operation to the circuit driven by output 1, IC2 pin 11, except that the relation of L2 and CR6 produces a negative voltage at the output (-6V). The output voltage is amplified by IC3B and compared in IC3A with the triangular wave from IC2 pin 8.

(IC2 pin 5 feeds the triangular wave to the internal comparator.) The output of IC3A controls IC2 pin 16, which varies the symmetry of output 2 relative to output 1, providing independent regulation of the second supply.

Board #4 is the same as #3 but set for +15, -15. Power supply #5 is set at 11.5V and provides voltage for the CRT. When the battery voltage is above the regulated level, current flows through CR4 ≅ 1V drop). When battery voltage falls, the regulator takes over putting a floor under the voltage.

IC4A provides low-battery information to the microprocessor. Battery voltage is compared with the reference voltage from IC2 via IC1B. When the battery voltage falls below a level set by R24, the output of IC4A goes high.

When the microprocessor signals low battery or asks for the card reader, it applies a positive voltage to the anodes of CR5 and CR6. Q3 turns on, bringing IC4 pin 7 low. This turns Q4 off, allowing K1 and K2 to switch to pins 16 and 14 respectively. This removes power from the display, and connects the battery to the card reader terminals. (The card reader is controlled by a signal from the control register card, and is not energized by the low-battery signal.)

At power on, IC4 pin 7 cannot go high until C13 charges through R28 to a voltage higher than the bias imposed on IC4 pin 6 by R29 and R31. This allows time for the regulator to come up to voltage.

2.1 Preparation

Prepare the 1855 for calibration by removing the top and bottom covers. The top cover can be removed by unfastening the #8 screw in the middle at the back of the unit. The bottom cover can be removed by unfastening the two rear feet from the unit. Most of the tests can be performed with the transmitter placed on its side with the front panel facing the user; providing easy access to test points and adjustments.

2.1.1 Power Supply Voltages

Check power supply voltages on pins 1-4 of M138. See Figure 1 for pin numbering system. Pin 1 is the unregulated +9 or 10 volts from the power supply. Pin 2 is the +5 volts that is regulated in the M138. Pin 3 is +18 volts and pin 4 is -18 volts. The ±18 volts should be adjusted to ±.01 volts using the adjustment pots on the power supply P.C. board. See the top view of the 1855 in the schematic section for the location of the adjustments.

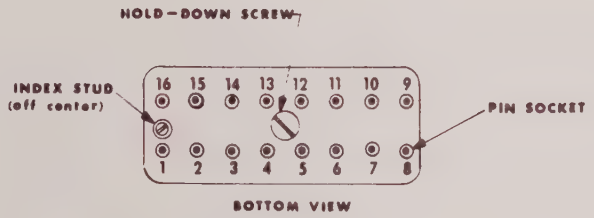


Figure 2.1. Module Pin Numbering System

2.1.2 Diagnostic Test Mode

The unit can be put into its test mode by pressing the "CLEAR ENTRY", "." (decimal point), and "CATV/CS" keys in succession, holding all of them until the last one has been pressed. "1855" should appear on the display. When

tests that are made in the diagnostic test mode are completed, pressing the "7" key will return the 1855 to its normal operating reset parameters.

L.E.D. Test

Pressing the "8" key will now activate all of the front panel LED's. This will enable a check of the relative brightness of the LED's and location of LED failures.

Ramp Test

Pressing the "9" key enables a test of the ramp card. There are 6 test points on the ramp card, labeled TP1-TP6. The test points will have the following indications, which should be monitored on an oscilloscope (referenced to ground).

TP1 = +13.5 VDC
TP2 = +13V Ramp
TP3 = +1.5V Ramp
TP4 = +10V Ramp
TP5 = +1V Ramp
TP6 = -10V Ramp

Sweep Drive Adjustment

Pressing "F-1" or "F-2" enables a test of start, stop, and center frequency. The center frequency should be set up first. Press "F-1". Pull the ramp card up out of its edge connectors. The frequency displayed on the front panel can now be adjusted to 200MHz by the "CENTER" pot on the M9L-1. Reseat the ramp card into its edge connectors. Pressing "F-1" will display the start frequency, and pressing "F-2" will display the stop frequency. The start frequency will adjust to 0MHz; the stop frequency will adjust to 400MHz. The width and center pots on the upper right hand corner of the ramp card are used to adjust the end points. The pots affect each other. Press "F-1". Adjust the width pot for a frequency halfway to the objective frequency (0.00MHz). Press "F-2". Adjust the center pot for a frequency halfway to the objective frequency (400MHz). Repeat this process until F-1 = 0.00MHz ±0.5MHz and F-2 = 400MHz ±0.5MHz.

2.1.3 Output Level Calibration

Disconnect the cable from the output of the M135 to the M171. Connect the power meter probe to the M135 output. With a +50dBmV front panel output setting, adjust the minimum pot on the M135 for a +40dBmV ±.2dB reading on the power meter. Then change the front panel output setting to +60dBmV and adjust the M135 maximum pot for a +50dBmV ±.2dB reading on the power meter. The maximum and minimum pots on the M135 affect each other so repeat the adjustments as necessary. (If there are two or three pilots in the transmitter, flip the dual pilot switch and follow the same adjustment procedure for each pilot module). Reconnect the cable to the output of the M135 module.

Connect the power meter probe to the 1855 RF output connector. Set the sweep repetition rate for 15 seconds. Adjust the "LEVEL PSK" pot on the M171 for an output level 20dB below the output level indicated on the front panel.

Press the "CATV/CS" key. Enter 200MHz for F-1 and F-2. This makes the output a CW signal at 200MHz. Set the 1855 level at +50dBmV. Adjust the "MIN" pot on the M171 for a power meter reading of +50dBmV ±0.2dB. Set the 1855 level at +60dBmV. Adjust the "MAX" pot on the M171 for a power meter reading of +60dBmV ±0.2dB.

2.1.4 Horizontal Output

Check the horizontal output on the rear of the 1855 by connecting it to a scope. With the transmitter in CS (constant sweep) mode, (press the "CATV/CS" key) the ramp should be 10V peak and 1ms retrace. The frequency will vary as the sweep rate is changed.

2.1.5 Harmonic Output

Check the harmonic output of the 1855 by connecting the RF output to a spectrum analyzer. Start with a CW signal at 10MHz and +60dBmV. Move the signal through the frequency range of the 1855 by holding the " " key. Harmonics should be ≥30dB down from the carrier. Spurs should be ≥35dB down. If these are out of specification and appear to be causing a problem, we recommend the unit be returned to Wavetek. Please call 800-622-5515 for a return authorization number.

2.1.6 1855 DIP SHUNT CALIBRATION PROCEDURE

One indication of an improperly cut or uncut dip shunt is a sweep response with a grassy display on the 1865.

1. With the 1855 unplugged, slide off the top cover by removing the single #8 screw from the top rear of the unit.

2. Connect the center conductor of the frequency counter to pin B of the microprocessor card. (Pin A is open, so shorting to this pin will not damage the unit.) The microprocessor card is the plug in card closest to the front of the unit. This card can be damaged by static electricity if removed from the unit, so static safe handling procedures must be followed!

3. The shield of the frequency counter probe should be grounded to the 1855 chassis.

4. Plug the 1855 line cord in, turn the unit on, and allow it to warm up for five minutes.

5. Set the frequency counter to measure 1 MHz and record the error from 1MHz in Hz.

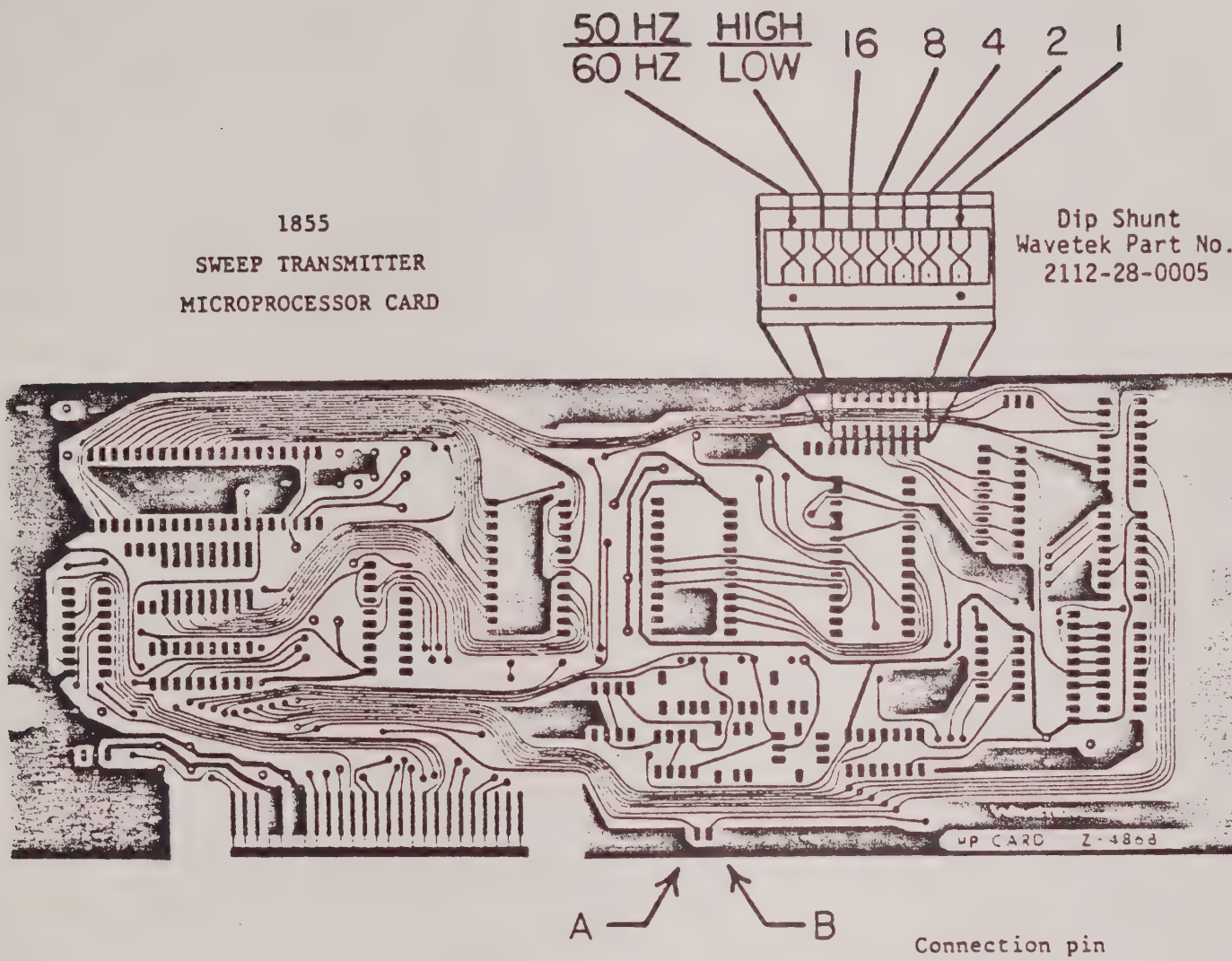
   Example: Count of 1.000053MHz is 53Hz high
   Count of .999994MHz is 6Hz low

Refer to Diagram of Dip Shunt for the following steps.

6. a. (50Hz AC Line Operation)
   If the unit is being calibrated for 50Hz operation, break the jumper marked $\frac{50Hz}{60Hz}$. Divide the error from Step 5 by 25Hz. This result will be used in Step 7.

   b. (60Hz AC Line Operation)
   If the unit is being calibrated for 60Hz operation, leave the jumper marked $\frac{50Hz}{60Hz}$ intact. Divide the error from Step 5 by 30Hz. This result will be used in Step 7.

If the result from Step 6 is greater than 16, the 4MHz crystal (X201) or the 27 pf caps (C203, C204) are bad. If the result from Step 6 is less than 16, break the proper "16, 8, 4, 2, 1" jumper such that the jumpers remaining intact add up to the error number from Step 6. If the error was high, break the "$\frac{High}{Low}$" jumper.



Calibration Example:

With the unit set up per Steps 1, 2, 3, and 4, the frequency measured in Step 5 is 87Hz high. The Step 6 calculated error is $\frac{87}{30} = 3$. To calibrate the dip shunt, break the "$\frac{\text{High}}{\text{Low}}$", "16", "8" & "4" jumpers, leaving the "50Hz", "2" and "1" jumpers intact.

Calibrated Dip Shunt:

3.1 Preparation

Remove the unit from the cabinet by removing the 16 phillips head screws from the outer edge of the front panel. Push the unit out as far as you can from the rear, through the opening for access to the charging connector. Then grasp the front panel, hook your feet in the cabinet belt and pull the unit the rest of the way out of the cabinet.

Remove the top and bottom covers.

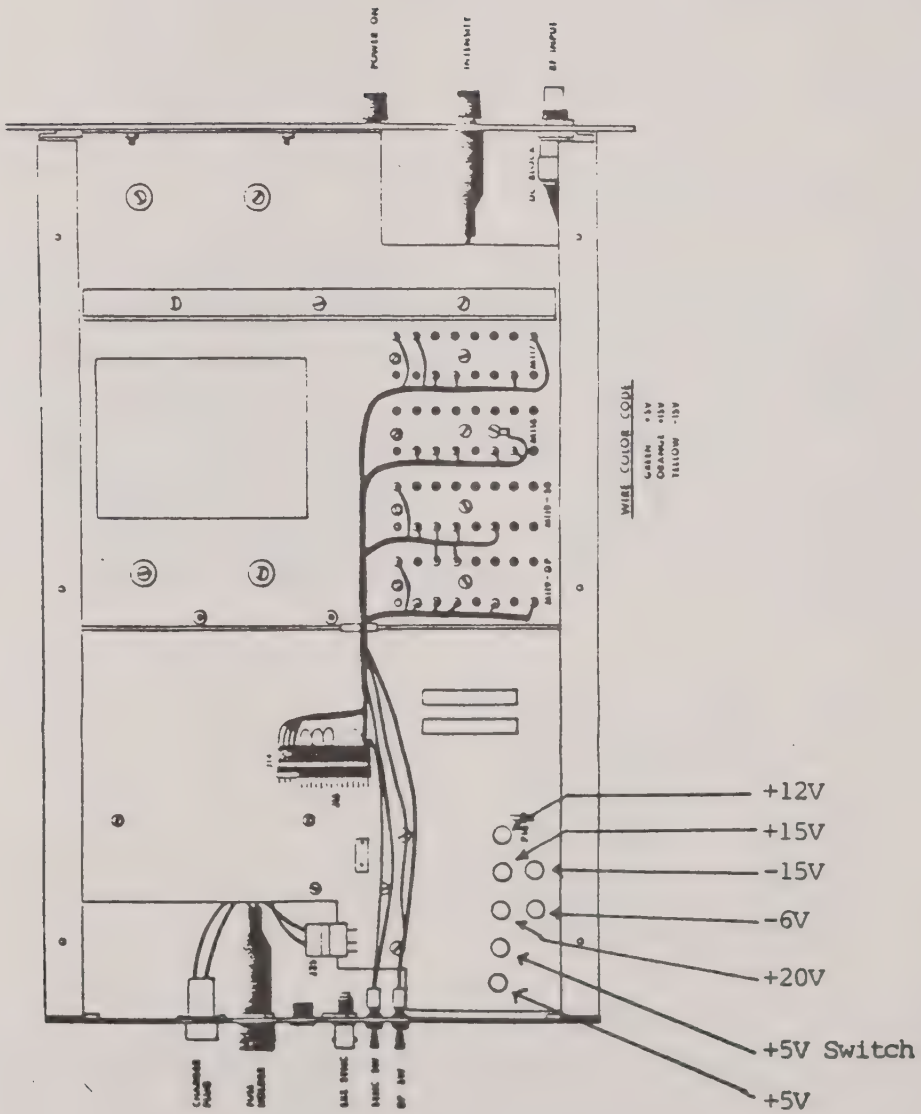
3.1.1 Power Supply Adjustments

See the top view of the 1865 in the schematic section for location of power supplies and adjustments. The power supplies are the smaller printed circuit assemblies in the back of the unit next to the battery cavity. The voltages are measured on the bottom of the unit, on the mother board, where the boards plug into the unit. See Figure 5-2 for the location of voltage test points. A voltmeter probe, referenced to chassis ground, can be placed on these points to measure and set each of the following voltages, numbered one through five from back to front. Set the power supply voltages to the following specifications.

Both +5V Adj. to +5VDC ±.05
-6V Adj. to -6VDC ±.05
+20V Adj. to +20VDC ±.10
+15V Adj. to +15VDC ±.05
-15V Adj. to -15VDC ±.05
+12V Adj. to +11.3VDC ±.05

NOTE: As a battery-saving feature, three of the 1865 power supplies power down when not in use. In order to keep the power supplies in the power on mode remove the jumper (J201) on the register card. Be sure to put this jumper back in the same position (to the left) when power supply adjustments are completed. Connect the 1855 RF output to the 1865 RF input and check supplies 2 through 4 to make sure that they power down between triggers.

1865 BOTTOM VIEW



3.1.2 Low Battery Adjustment

To keep the battery from going into a state of deep discharge, when the battery voltage discharges to 10.4 volts a "BATT" indication appears in the lower right corner of the display. About one minute after the indication appears the CRT will blank off. This slows the drain on the battery. The low-battery indication voltage is controlled by an adjustment of R24 on power supply number 5. In order to make this adjustment, remove the battery from the circuit by taking out the 4 amp fuse in the back of the 1865. Plug a variable DC voltage supply into the charge connector. Connect a DVM to the positive terminal of the charge connector in order to monitor the variable supply voltage. Put the 1865 in the "HOLD" mode. Slowly decrease the voltage from +12VDC and monitor the CRT display, watching for the "BATT" indication. Adjust R24 so that the "BATT" indication appears when the variable supply voltage is at 10.4VDC.

3.1.3 CRT

The CRT display may be centered in the bezel by rotating the two metal rings around the CRT yoke. Vertical display size can be adjusted by tuning L1, the tuneable coil on the high voltage board. For horizontal size and linearity adjustments refer to the CRT schematic to find which pots control which functions. Part of Wavetek's modification of the CRT, to make it fit in our application, is to turn the yoke 90°. For this reason the functions on the CRT PC board designated as vertical are actually horizontal adjustments. The CRT schematic has the proper reference designations and function labels.

3.1.4 M119

Check Pin 1 of the M119 (refer to figure 5-1 for pin numbering system) for a DC voltage between -5 and -9VDC. The unit must be in power up mode (input indication on lower right of display) and a pilot present. If the 1865 has a triggering problem and this phase-lock voltage is out of range, please call Wavetek at 800-622-5515 for a return authorization number for either the 1865 or the M119 module.

3.1.5 Frequency Adjustment

With an accurate 200MHz CW source summed in at the same amplitude as the sweep from the transmitter, and the transmitter set up to sweep from 180 to 220MHz, a zero beat marker will be created. Adjust the frequency offset pot (R426) on the A/D card so that the marker is in the center of the display.

3.1.6 Gain Adjustment

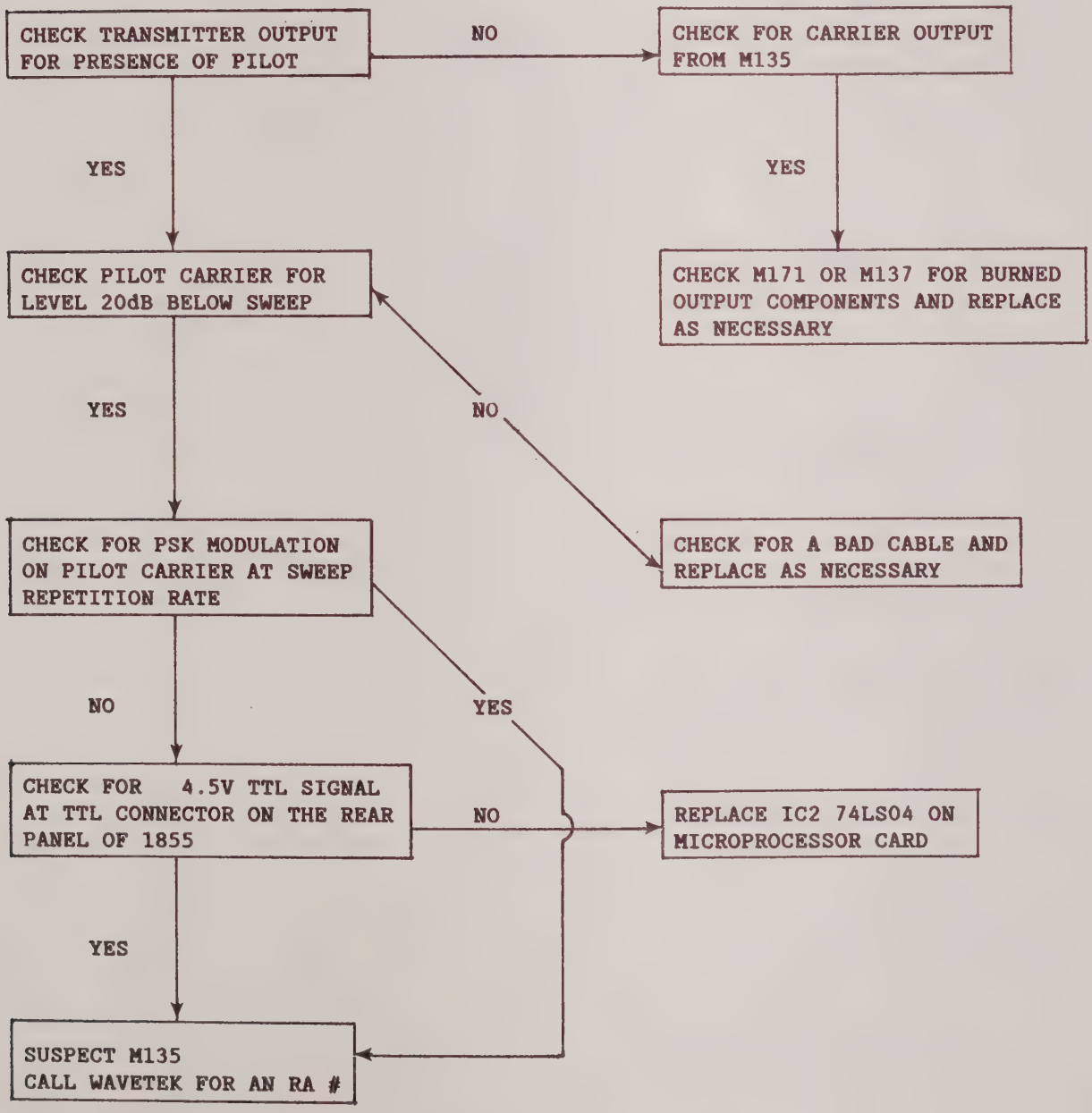
Set the 1865 attenuators at 65dB and the output of a calibrated 1855 at +55dBmV. The adjustment is on the M118. Make sure the MAN/AUTO switch is in the AUTO position. Adjust the GAIN pot so that the response lines up with the middle graticule line of the display. (NOTE: Do not adjust the CENTER pot. This is only adjusted during the original calibration of the module, which is done in a special test fixture.)

3.1.7 Timing Adjustments

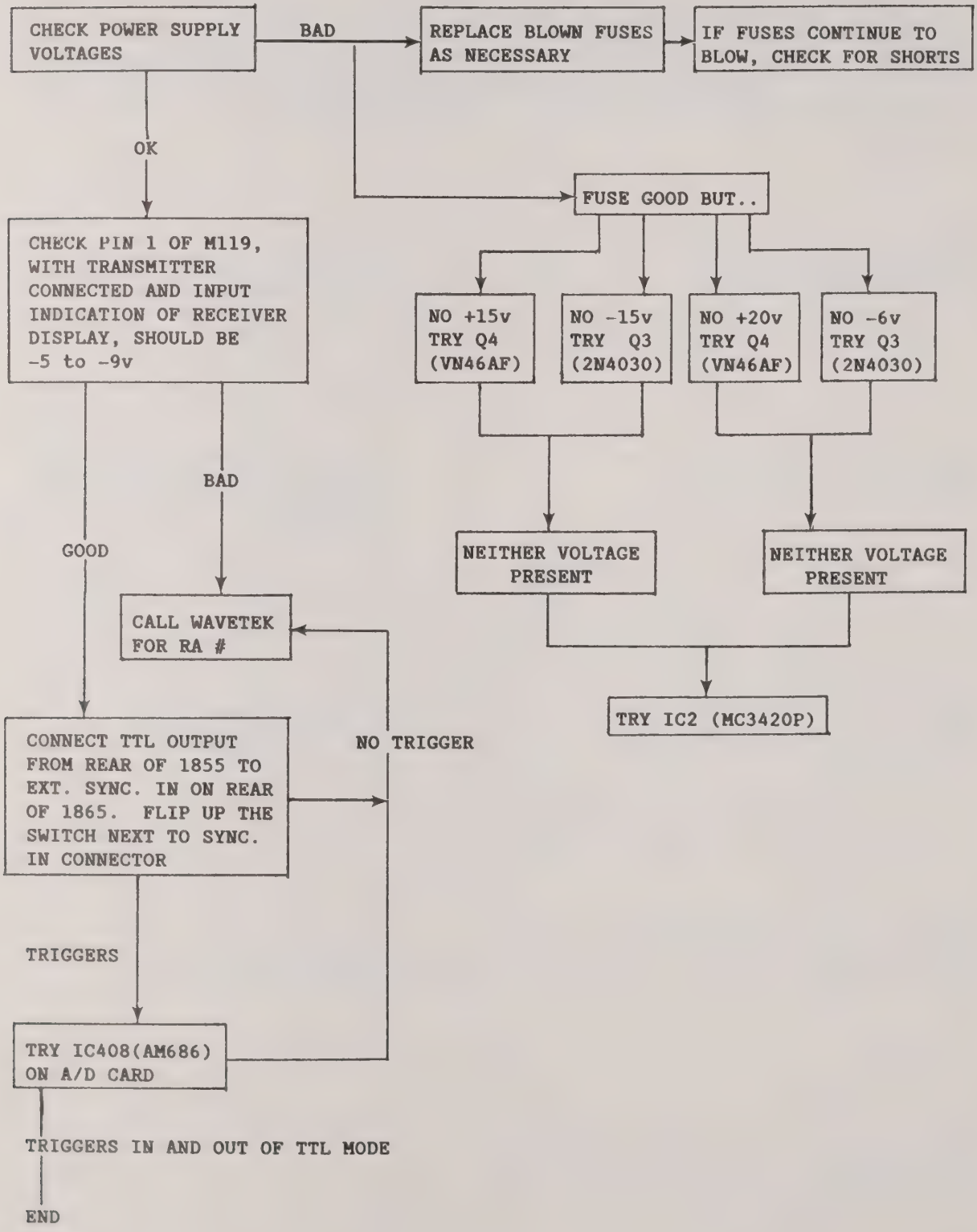
If it is necessary, the intensity of the GRID, DATA, cursors in LINE or AMPLitude modes, and the ALPHA-numerics can each be adjusted individually with the row of pots at the top of the VERTICAL/HORIZONTAL TIMING CARD. Adjust the LINE pots with the unit in LINE mode and the DOT pots with the unit in the DOT mode. In the line mode the GRID should have less intensity than the DATA, and the cursors in LINE AMPL and the LINE FREQ should have brightness equal to or brighter than the DATA. The ALPHA's should be the same intensity as the DATA. In the DOT mode, the GRID should be the same intensity as the LINE GRID. The DOT DATA should be brighter than the cursors (DOT AMPL and DOT FREQ), which should be as bright as the line cursors.

Probably the most common type of failure in the sweep recovery system is the lack of a trigger, or update of the sweep response. The first thing to do when this occurs is check the pilot and sync switches on the rear panel of both units to make sure they are in the proper positions. The following trouble shooting tree should be an aid in trouble analysis.

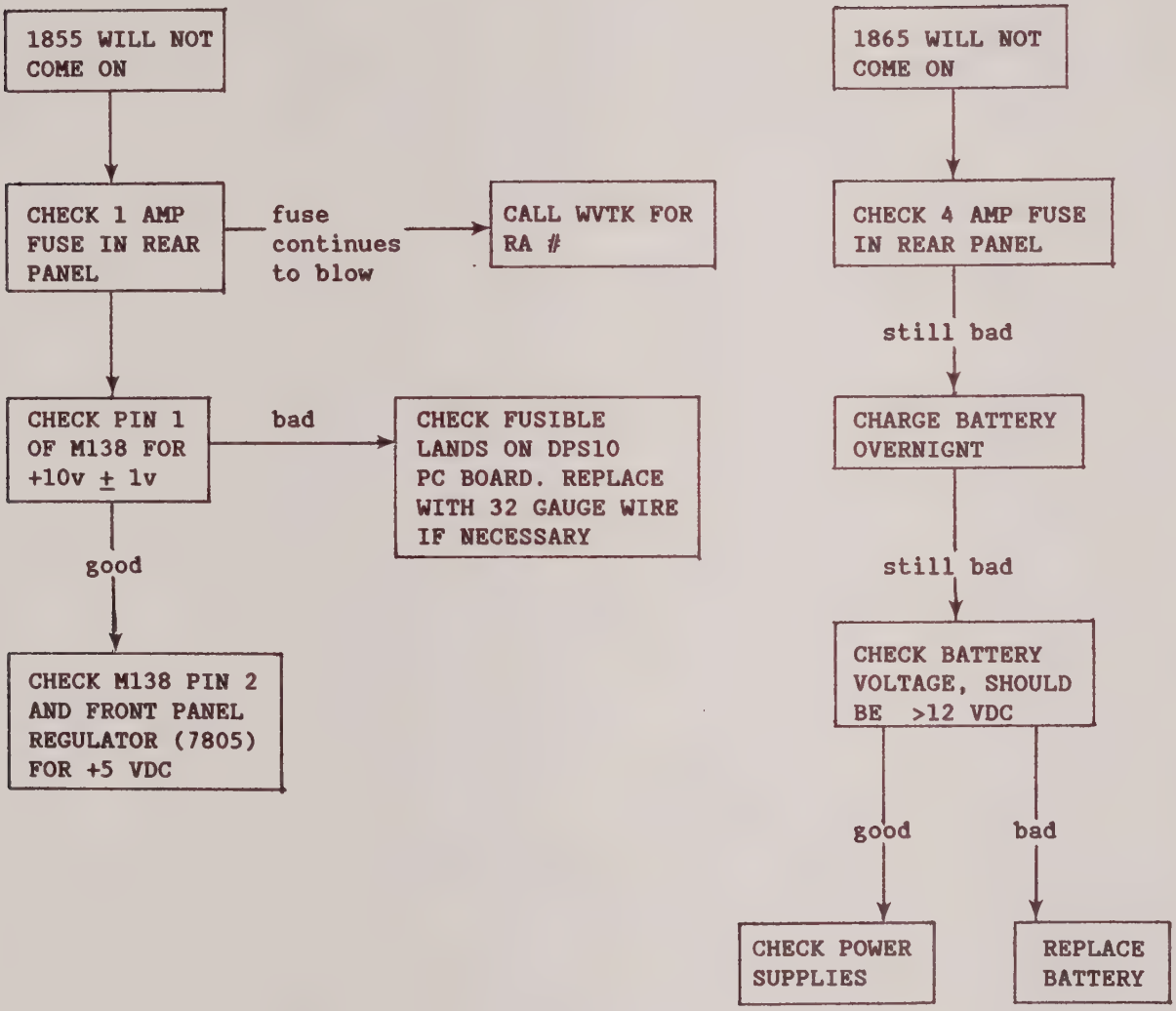
START


CHECK TRANSMITTER OUTPUT FOR PRESENCE OF PILOT
NO
CHECK FOR CARRIER OUTPUT FROM M135
YES
YES
CHECK PILOT CARRIER FOR LEVEL 20dB BELOW SWEEP
CHECK M171 OR M137 FOR BURNED OUTPUT COMPONENTS AND REPLACE AS NECESSARY
YES
NO
CHECK FOR A BAD CABLE AND REPLACE AS NECESSARY
CHECK FOR PSK MODULATION ON PILOT CARRIER AT SWEEP REPETITION RATE
NO
YES
CHECK FOR 4.5V TTL SIGNAL AT TTL CONNECTOR ON THE REAR PANEL OF 1855
NO
REPLACE IC2 74LS04 ON MICROPROCESSOR CARD
YES
SUSPECT M135
CALL WAVETEK FOR AN RA #

The following troubleshooting tree will aid in analysis of 1865 problems, after the performance of the 1855 transmitter has been verified.


CHECK POWER SUPPLY VOLTAGES
BAD
REPLACE BLOWN FUSES AS NECESSARY
IF FUSES CONTINUE TO BLOW, CHECK FOR SHORTS
OK
FUSE GOOD BUT..
CHECK PIN 1 OF M119, WITH TRANSMITTER CONNECTED AND INPUT INDICATION OF RECEIVER DISPLAY, SHOULD BE -5 to -9v
NO +15v TRY Q4 (VN46AF)
NO -15v TRY Q3 (2N4030)
NO +20v TRY Q4 (VN46AF)
NO -6v TRY Q3 (2N4030)
BAD
GOOD
NEITHER VOLTAGE PRESENT
NEITHER VOLTAGE PRESENT
CALL WAVETEK FOR RA #
TRY IC2 (MC3420P)
CONNECT TTL OUTPUT FROM REAR OF 1855 TO EXT. SYNC. IN ON REAR OF 1865. FLIP UP THE SWITCH NEXT TO SYNC. IN CONNECTOR
NO TRIGGER
TRIGGERS
TRY IC408(AM686) ON A/D CARD
TRIGGERS IN AND OUT OF TTL MODE
END

The following troubleshooting trees will aid in the analysis of problems with the turn on of the transmitter and receiver.


1855 WILL NOT COME ON
CHECK 1 AMP FUSE IN REAR PANEL
fuse continues to blow
CALL WVTK FOR RA #
CHECK PIN 1 OF M138 FOR +10v ± 1v
bad
CHECK FUSIBLE LANDS ON DPS10 PC BOARD. REPLACE WITH 32 GAUGE WIRE IF NECESSARY
good
CHECK M138 PIN 2 AND FRONT PANEL REGULATOR (7805) FOR +5 VDC
1865 WILL NOT COME ON
CHECK 4 AMP FUSE IN REAR PANEL
still bad
CHARGE BATTERY OVERNIGNT
still bad
CHECK BATTERY VOLTAGE, SHOULD BE >12 VDC
good
bad
CHECK POWER SUPPLIES
REPLACE BATTERY

SECTION 5

PARTS LIST

1855B

		PAGE
CATV XMTR	1010-00-0167	42
CABLE ASSY, 4 ¾ IN	1217-70-0058	
CABLE ASSY, 8 ½ IN	1217-70-0059	43
CABLE ASSY, 1 ¾ IN	1217-90-0028	
LATCH CARD	1110-00-0160	
RAMP CARD	1110-00-0180	44-45
UPROC BD	1110-00-9004	46-47
CHASSIS	1111-00-0090	48
LOOP COUNTER, M138	1114-00-0266	
PC ASSY, M138	1218-00-0490	49
SWP OSC, M9L-1	1114-00-0310	50-51
M9L-1 MODULE ASSY	1216-40-0012	52
SUMMING OUTPUT AMP, M171	1114-00-0348	53
PC ASSY, M171	1218-00-1350	54-55
PSK MODULATOR, M135-50	1114-00-0355	56
PC ASSY, M135-50	1218-00-0470	57-58
POWER SUPPLY,DPS10	1115-00-0017	59
PC ASSY, DPS10	1218-00-0170	60
LINE CORD ASSY,DPS10	1219-40-0013	61
FRONT PANEL	1118-00-0045	
FRONT PANEL PC	1218-00-0550	62
PWR SWITCH, 16 ½	1212-00-0011	63
MAIN BD 1	1218-00-0530	
MAIN BD 2	1218-00-0540	
HARNESS,1855	1219-00-0160	

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
01	CHASSIS, 1855	1855-CHAS	W-I	1111-00-0090	1.000
04	SUMMING OUTPUT AMP, M171	M171	W-I	1114-00-0348	1.000
05	SWP OSC, M9L-1	M9L-1	W-I	1114-00-0310	1.000
08	LOOP COUNTER, M138	M138	W-I	1114-00-0266	1.000
100	FRONT PANEL, 1855	1855-FP	W-I	1118-00-0045	1.000
400	LATCH CARD, 1855	1855-LATCH CD	W-I	1110-00-0160	1.000
500	RAMP CARD, 1855	1855-RAMP CD	W-I	1110-00-0180	1.000
W01	CABLE ASSY, 4 3/4 IN	WX1855-W1	W-I	1217-70-0058	1.000
W02	CABLE ASSY,8-1/2 IN	WX1855-W2	W-I	1217-70-0059	1.000
W04	CABLE ASSY, 1 3/4 IN	WX1855-W4	W-I	1217-90-0028	1.000
W05	CABLE ASSY,1-1/2IN	WX1855-W5	W-I	1217-90-0032	1.000

WAVETEK PARTS LIST	CATV XMTR,1855B	1010-00-0167 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CONN JF000-008	27-25	APL	2110-03-1004	2.000

WAVETEK PARTS LIST	CABLE ASSY, 4 3/4 IN	1217-70-0058 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CONN,BNC,75,PANEL	28JS161-1	S-C	2110-01-1020	1.000
2	CONN JF000-008	27-25	APL	2110-03-1004	1.000
K2	NUT JZ000-004	N101-4	S-C	2111-00-0002	1.000
K3	GASKET JZ000-005	G101-5	S-C	2111-01-0002	1.000
K4	CLAMP JZ000-006	BC101-4	S-C	2111-02-0002	1.000

WAVETEK PARTS LIST	CABLE ASSY,8-1/2 IN	1217-70-0059 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CONNECTOR,SMC RA	37P121-1	S-C	2110-03-1005	2.000

WAVETEK PARTS LIST	CABLE ASSY, 1 3/4 IN	1217-90-0028 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C401 C402	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	2.000
C403 C404 C405	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	3.000
C406	CAP,ELEC,10V,150UF	503D157M025NB	SPR	1510-20-8151	1.000
C407	CAP,DISC,1KV,150PF	60U151M	MDC	1510-10-1151	1.000
C408	CAP,MICA,500V,560PF	DM-15-561J	ARC	1510-50-0561	1.000
IC401	PO VOLTAGE REG.	UA7805UC	FCD	7000-78-0523	1.000
IC402 IC403 IC405 IC406 IC407 IC408	OCTAL D FLIP FLOP	SN74LS273N	T-I	8007-42-7310	6.000
IC404	QUAD D FLIP-FLOP	SN74LS175N	T-I	8007-41-7510	1.000
IC409	DCDR/DEMUXR	SN74LS138N	T-I	8007-41-3810	1.000
IC410	QUAD NOR	SN74LS02N	T-I	8000-74-0210	1.000
R401	RES,C,1/4W,5%,3.3K	CF1/4-3.3K	ASE	4700-15-3301	1.000
R402	RES,C,1/4W,5%,220	CF1/4-220	ASE	4700-15-2200	1.000

WAVETEK PARTS LIST	LATCH CARD, 1855	1110-00-0160 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C501 C502 C503 C504 C508 C509 C510 C511 C516 C517 C519 C520 C522 C523 C526 C527 C528 C529 C532 C533 C534	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	21.000
C505	CAP,FILM,50V,.22UF	F141A2203K050S	UNCAR	1510-61-0224	1.000
C506 C507	CAP,DISC,1KV,75PF	10TS-Q75	SPR	1510-10-1750	2.000
C512 C514	CAP,TANT,50V,.47UF	T310A474050AS	UNCAR	1510-21-9470	2.000
C513 C515	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	2.000
C518 C521 C524 C525	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	4.000
C530 C531	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	2.000
IC501	COMPANDING DAC	DAC-86CX	PMI	8000-00-8600	1.000
IC502	QUAD ANALOG SWITCH STATIC SENSITIVE	HI-201-5	HSD	8000-02-0100	1.000
IC503	IC,IL003-001	LF355N	NAT	7000-03-5500	1.000
IC504 IC505 IC511 IC513 IC514	DAC,8-BIT	DAC-08EQ	AMD	8000-00-0800	5.000
IC506 IC515 IC516 IC519	OP AMP	N5741CV	SIG	7000-57-4100	4.000
IC507 IC512	DUAL OP AMP,RAY ONLY	RC4558NB-RAY	RAY	7000-45-5801	2.000
IC508	DUAL COMPARATOR	LM393N	NAT	7000-03-9310	1.000
IC509	VOLT REG,+15V	UA78M15UC	FCD	7000-78-1500	1.000
IC510	NEG VOLTAGE REG	UA79M15AUC	FCD	7000-79-1500	1.000
IC518	VOLTAGE REFERENCE	REF-02CJ	PMI	7000-00-0200	1.000
Q501	TRANS QA039-040	2N3904	NAT	4901-03-9040	1.000
R501	RES,MF,1/8W,1%,9.09K	RN55D-9.09K	MILSP	4701-03-9091	1.000
R502	RES,MF,1/8W,1%,200	RN55D-200	MILSP	4701-03-2000	1.000
R503	RES,C,1/4W,5%,9.1K	CF1/4-9.1K	ASE	4700-15-9101	1.000
R504 R515 R516 R530 R534 R535 R537 R550 R551 R552 R554 R565 R567	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	13.000
R505	RES,MF,1/8W,1%,100K	RN55D-100K	MILSP	4701-03-1003	1.000
R506	RES,MF,1/8W,1%,2.26K	RN55D-2.26K	MILSP	4701-03-2261	1.000
R507 R526 R570	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	3.000
R508 R509 R517 R518	RES,C,1/4W,5%,20	CF1/4-20	ASE	4700-15-2009	4.000
R510 R527 R528 R571	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	4.000
R511 R513 R521 R556	RES,MF,1/8W,1%,4.99K	RN55D-4.99K	MILSP	4701-03-4991	4.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R512 R514 R519 R538 R553 R569	RES,C,1/4W,5%,5.1K	CF1/4-5.1K	ASE	4700-15-5101	6.000
R520 R555	RES,C,1/4W,5%,510	CF1/4-510	ASE	4700-15-5100	2.000
R522 R557	RES,MF,1/8W,1%,499	RN55D-499	MILSP	4701-03-4990	2.000
R523 R525 R562	RES,MF,1/8W,1%,2K	RN55D-2K	MILSP	4701-03-2001	3.000
R524	RES,MF,1/8W,1%,12.8K	RN55D-12.8K	MILSP	4701-03-1282	1.000
R529	RES,C,1/4W,5%,4.7M	CB4755	A-B	4700-15-4704	1.000
R531 R544 R547	RES,MF,1/8W,1%,1.40K	RN55D-1.40K	MILSP	4701-03-1401	3.000
R532 R545 R548	RES,MF,1/8W,1%,1.1K	RN55D-1.1K	MILSP	4701-03-1101	3.000
R533 R546 R549	RES,C,1/4W,5%, 2.4K	CF1/4-2.4K	ASE	4700-15-2401	3.000
R536	RES,C,1/4W,5%,6.8K	CF1/4-6.8K	ASE	4700-15-6801	1.000
R539 R541	RES,C,1/4W,5%,3K	CF1/4-3K	ASE	4700-15-3001	2.000
R540	RES,C,1/4W,5%,3.3K	CF1/4-3.3K	ASE	4700-15-3301	1.000
R542	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	1.000
R543	RES,C,1/4W,5%,20K	CF1/4-20K	ASE	4700-15-2002	1.000
R558 R559	RES,MF,1/8W,1%,1K	RN55D-1K	MILSP	4701-03-1001	2.000
R560	RES,MF,1/8W,1%,1.50K	RN55D-1.50K	MILSP	4701-03-1501	1.000
R561	RES,MF,1/8W,1%,11.3K	RN55D-11.3K	MILSP	4701-03-1132	1.000
R563	RES,C,1/4W,5%,3.9K	CF1/43.9K	ASE	4700-15-3901	1.000
R564 R568	POT,2K,RP130-220	89PR2K	BEK	4610-00-2202	2.000
R566	RES,C,1/4W,5%,560	CF1/4-560	ASE	4700-15-5600	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C201 C202 C205	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	3.000
C203 C204	CAP,MICA,500V,27PF	CM05ED270J03	ARC	1510-50-0270	2.000
C206 C208 C209 C213 C214	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	5.000
C207	CAP,DISC,1KV,470PF	60U471M	MDC	1510-10-1471	1.000
C210 C211	CAP,ELEC,10V,150UF	503D157M025NB	SPR	1510-20-8151	2.000
C212	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	1.000
IC201	UPROC W/CLK & RAM STATIC SENSITIVE	MC6802P	MOT	8000-68-0210	1.000
IC202	HEX INVERTER	SN74LS04N	T-I	8000-74-0410	1.000
IC203 IC204	DCDR/DEMUXR	SN74LS138N	T-I	8007-41-3810	2.000
IC205	ROM,MOD19,1855B,LEFT FROM:8000-25-1610	8410-00-0017	W-I	8410-00-0017	1.000
IC206	ROM,MOD19,1855B,RHT, FROM:8000-25-1610	8410-00-0018	W-I	8410-00-0018	1.000
IC207	PGM TIMER STATIC SENSITIVE	MC6840P	MOT	8000-68-4010	1.000
IC208	OCTAL BFR/DRVR/RCVR	SN74LS240N	T-I	8007-42-4010	1.000
IC209	DUAL COMPARATOR	LM393N	NAT	7000-03-9310	1.000
IC210	8-IN POS NAND	SN74LS30N	T-I	8000-74-3010	1.000
IC211	PO VOLTAGE REG.	UA7805UC	FCD	7000-78-0523	1.000
IC212	OCTAL BUS XVR	SN74LS245N	T-I	8007-42-4510	1.000
IC213	OCTAL BUF/LN DRVR	SN74LS244N	T-I	8007-42-4410	1.000
IC214	HEX 3-STATE BUFFER	8T95	SIG	8000-08-9510	1.000
P202	HEADER,3-PIN STRT REF:2112-07-0000	MC000-096	W-I	2112-07-0001	1.000
P203	HEADER,STRT,2 PIN REF:2112-07-0000	2112-07-0007	W-I	2112-07-0007	1.000
P204 P205	PGM DIP SHUNT	435704-8	AMP	2112-28-0001	2.000
P206	PGM DIP SHUNT, 7-POS	435704-7	AMP	2112-28-0005	1.000
Q201	TRANS QA039-060	2N3906	T-I	4901-03-9060	1.000
Q202	TRANS QA039-040	2N3904	NAT	4901-03-9040	1.000
R201 R217	RES,C,1/4W,5%,3.3K	CF1/4-3.3K	ASE	4700-15-3301	2.000
R202 R203	RES NTWK,SIP,9-470K	109-474J	EPITK	4770-00-0011	2.000
R204 R205	RES NTWK,SIP,9-4.7K	109-472J	EPITK	4770-00-0014	2.000
R206	RES,MF,1/8W,1%,90.9K	RN55D-90.9K	MILSP	4701-03-9092	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R207	RES,MF,1/8W,1%,13.0K	RN55D-13.0K	MILSP	4701-03-1302	1.000
R208	RES,MF,1/8W,1%,442K	RN55D-442K	MILSP	4701-03-4423	1.000
R209	RES,MF,1/8W,1%,110K	RN55D-110K	MILSP	4701-03-1103	1.000
R210 R211	RES,C,1/4W,5%,51K	CF1/4-51K	ASE	4700-15-5102	2.000
R212	RES,C,1/4W,5%,5.1K	CF1/4-5.1K	ASE	4700-15-5101	1.000
R213	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	1.000
R214 R215	RES,1/8W,1%, 49.9K	RN55D-49.9K	MILSP	4701-03-4992	2.000
R216	RES,C,1/4W,5%,1M	CF1/4-1M	ASE	4700-15-1004	1.000
R218	RES,C,1/4W,5%,10M	CB1065	A-B	4700-15-1005	1.000
R219	RES,C,1/4W,5%,200K	CF1/4-200K	ASE	4700-15-2003	1.000
R220	RES,C,1/4W,5%,33K	CF1/4-33K	ASE	4700-15-3302	1.000
R221	RES,C,1/4W,5%,560K	CF1/4-560K	ASE	4700-15-5603	1.000
R222	RES,C,1/4W,5%,470K	CF1/4-470K	ASE	4700-15-4703	1.000
X201	CRYSTAL, 4 MHZ	MP040	CTS-E	2310-00-0451	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
J501	PC EDGE CONN,12-CKT	031-06134-200	TEKA	2112-27-0004	1.000
NONE	SUP BRKT PER B/P	1410-30-1180	W-I	1410-30-1180	1.000

WAVETEK PARTS LIST	CHASSIS, 1855	1111-00-0090 PAGE: 1	H REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C01 C02 C05 C10	CAP,FT,500V,1000PF	54-794-010-102P	SPEC	1510-30-8102	4.000
C03	CAP,TANT,25V,1UF	100DE105K25A2	ACI	1510-21-7010	1.000
C04	CAP,ELEC,6V,100UF	ME3B100	ARC	1510-21-1101	1.000
C06 C11	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	2.000
C14	CAP,FT,500V,6.8PF	54-794-010-6892	SPEC	1510-30-1689	1.000
IC01	VOLT REG,+5V	78M05U1C	FCD	7000-78-0500	1.000
J01	CONN JF000-005	37JR116-1	S-C	2110-03-0002	1.000
L01 L02 L06 L08	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	4.000
L03	TOROID,10T,1-1/2L	LA009-010-2	W-I	1810-05-0005	1.000

WAVETEK PARTS LIST	LOOP COUNTER, M138	1114-00-0266 PAGE: 1	D REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C07 C08 C16	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	3.000
C09 C12 C13 C15	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	4.000
C14 C17	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	2.000
CR01 CR02 CR03 CR04	DIODE,SCHOTTKY	5082-2835	H-P	4809-02-0002	4.000
IC02	DIVIDE-BY-10, ECL STATIC SENSITIVE	11C90DC	FCD	8000-11-9000	1.000
IC03	UP/DN COUNTER	SN74S169	T-I	8007-41-6900	1.000
L04 L05 L07	TOROID,4T,1-1/4L	LA009-004-1	W-I	1810-05-0003	3.000
L09	COL,AIR,6T,.200 ID	6T,PER SPEC.	ATR	1815-00-0004	1.000
L10	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	1.000
Q01	TRANSISTOR,NPN, MOT ONLY	2N5179-MOT	MOT	4901-05-1791	1.000
R01 R04	RES,C,1/4W,5%,1.2K	CF1/4-1.2K	ASE	4700-15-1201	2.000
R02	RES,C,1/4W,5%,5.1K	CF1/4-5.1K	ASE	4700-15-5101	1.000
R05 R06	RES,C,1/4W,5%,3K	CF1/4-3K	ASE	4700-15-3001	2.000
R07	RES,C,1/4W,5%,110	CF1/4-110	ASE	4700-15-1100	1.000
R08	RES,C,1/8W,5%,240	CF1/8-240	ASE	4700-05-2400	1.000
R09	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	1.000
R10 R11	RES,C,1/8W,5%,33	CF-1/8-33	ASE	4700-05-3309	2.000
R12	RES,C,1/8W,5%,20K	CF1/8-20K	ASE	4700-05-2002	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
6	NUT,6-32X1/4HN101-600	8005NP	F-S	2810-14-6100	2.000
7	INT,LOWASHER,6 HW101-600	1304ZP	F-S	2810-24-6000	2.000
10	TUBE	A000-694	W-I	1410-00-1360	1.000
14	INDUCTOR STRAP	A000-743	W-I	1410-00-1580	1.000
20	FERR. BEAD,LC000-009	K5-001-00/3B	FRXC	1813-00-0007	2.000
C04 C20	CAP,DISC,1KV,100PF	CN1500-100PF	RMC	1510-10-5101	2.000
C7	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	1.000
C08	CAP,COMP,500V,.75PF	QC-.75PF	Q-C	1510-40-0758	1.000
C09 C12 C15	CAP,TANT,50V,.47UF	T310A474050AS	UNCAR	1510-21-9470	3.000
C10	CAP,COMP,500V,.47PF	MC-.47PF	Q-C	1510-40-1478	1.000
C14*	CAP,COMP,500V,2.4PF	QC-2.4PF	Q-C	1510-40-0249	1.000
C16*	CAP,COMP,500V,.27PF	MC-.27PF	Q-C	1510-40-1278	1.000
C24 C26	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	2.000
C27 C30	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	2.000
C28	CAP,VALUE DETERMINED IN CALIBRATION	CAP,TRIM	W-I	1519-99-9999	1.000
C32*	CAP,COMP,500V,3.9PF	QC-3.9PF	Q-C	1510-40-0399	1.000
C34	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	1.000
C36 C37	CAP,TANT,25V,1UF	100DE105K25A2	ACI	1510-21-7010	2.000
CR01 CR02 CR03 CR07 CR08	DIODE DC000-005	BB121A	ITT	4889-00-0001	5.000
CR04 CR05	DIODE,SCHOTTKY	5082-2835	H-P	4809-02-0002	2.000
CR06 CR09	DIODE,ZENER,6.8V	1N4736A	MOT	4801-02-0001	2.000
L01 L03	CHOKE,COATED,.22UH	08NR22	JEF	1810-03-0228	2.000
L02 L10	CHOKE,8T,32 GA FROM:4705-16-4701	1210-33-0001	W-I	1210-33-0001	2.000
L04 L11	RF CHOKE,REF ONLY	CHOKE	W-I	1819-99-9999	2.000
L05	WIRE,MGNT,32GA,GN	8056-GN	BEL	6010-73-2000	1.000
L09	CHOKE,COATED,1UH	08N1R0	JEF	1810-03-0010	1.000
L12 L18	TOROID,4T,1-1/4L	LA009-004-1	W-I	1810-05-0003	2.000
L13	CHOKE,COATED,4.7UH	08N4R7	JEF	1810-03-0479	1.000
L14 L15 L16 L17	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	4.000
Q01 Q08	TRANS QB000-009	MPS3702	NAT	4902-03-7020	2.000
Q02	TRANS QB000-013	A430	APX	4902-00-4300	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
Q03 Q05 Q06 Q13	TRANS QA050-530	2N5053	APX	4901-05-0530	4.000
Q07	TRANS QA050-880	2N5088	MOT	4901-05-0880	1.000
Q10 Q11 Q12	TRANSISTOR,NPN, MOT ONLY	2N5179-MOT	MOT	4901-05-1791	3.000
Q14	TRANS QA054-580	2N5458	MOT	4901-05-4580	1.000
R01	RES,C,1/4W,5%,18K	CF1/4-18K	ASE	4700-15-1802	1.000
R02 R27 R45 R46	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	4.000
R03 R22	POT,10K,RP129-310	360S103B	CTS	4610-00-1103	2.000
R04 R30	RES,C,1/4W,5%,680	CF1/4-680	ASE	4700-15-6800	2.000
R05 R06 R19 R31 R32 R38	RES,C,1/4W,10%,4.7K RC104-247AB	CB4721	A-B	4705-16-4701	6.000
R07 R33	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	2.000
R08	RES,C,1/4W,5%,5.6K	CF1/4-5.6K	ASE	4700-15-5601	1.000
R09	POT,20K,RP129-320	360S203B	CTS	4610-00-1203	1.000
R10	RES,C,1/4W,5%,47K	CF1/4-47K	ASE	4700-15-4702	1.000
R11	RES,C,1/4W,5%,4.7	CF1/4-4.7	ASE	4700-15-4708	1.000
R12	RES,C,1/4W,5%,390	CF1/4-390	ASE	4700-15-3900	1.000
R13 R21 R34 R35 R39	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	5.000
R14 R17 R36 R37	RES,C,1/4W,5%,470	CF1/4-470	ASE	4700-15-4700	4.000
R18 R20 R40	RES,C,1/4W,5%,47	CF1/4-47	ASE	4700-15-4709	3.000
R24	RES,C,1/4W,5%,7.5K	CF1/4-7.5K	ASE	4700-15-7501	1.000
R25	RES,C,1/4W,5%,33K	CF1/4-33K	ASE	4700-15-3302	1.000
R26	RES,C,1/4W,5%,4.7K	CF1/4-4.7K	ASE	4700-15-4701	1.000
R29	RES,C,1/4W,5%,2.2K	CF1/4-2.2K	ASE	4700-15-2201	1.000
R41	RES,C,1/4W,5%,150	CF1/4-150	ASE	4700-15-1500	1.000
R42	RES,C,1/4W,5%,22	CF1/4-22	ASE	4700-15-2209	1.000
R43	RES,C,1/4W,5%,10M	CB1065	A-B	4700-15-1005	1.000
R44	RES,C,1/4W,5%,15M	CB1565	A-B	4700-15-1505	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
3	INDEX STUD	A001-009	W-I	1410-00-2680	1.000
4	CLOVERLEAF FTE-12 HT101-000	011-6808-000-59-9	SEL	2112-18-0001	25.000
5	CLOVERLEAF FTE-15 HT102-000	011-6809-00-0-599	SEL	2112-18-0002	1.000
6	NUT,6-32X1/4HN101-600	8005NP	F-S	2810-14-6100	2.000
7	INT,LOWASHER,6 HW101-600	1304ZP	F-S	2810-24-6000	2.000
8	COMPART BOX	A001-313	W-I	1410-00-3800	1.000
9	COMPARTMENT WALL	A001-312	W-I	1410-00-3790	2.000
11	SCW,SBH,6-32X1/4	6-32X1/4,UC,BH,NP	S-S	2810-17-6104	1.000
12	COVER,SMALL FROM:1410-00-1180	A000-693	W-I	1410-00-1359	2.000
13	GROUND STRAP REF:3210-99-0024	A000-671	W-I	1410-00-1229	2.000
C01 C33	CAP,FT,500V,6.8PF	54-794-010-6892	SPEC	1510-30-1689	2.000
C02 C05 C11 C13 C17 C18 C19 C21 C29 C31	CAP,FT,250V,500PF	4420-500PF	AER	1510-30-3501	10.000
C03 C06 C22	CAP,FT,250V,100PF	4420-100PF	AER	1510-30-3101	3.000
C23 C25	CAP,FT,500V,470PF	FA5C-4712	A-B	1510-30-0471	2.000
J01 J02	CONN JF000-005	37JR116-1	S-C	2110-03-0002	2.000
R23	POT,20K	WA2G032S-203MA	A-B	4610-10-7203	1.000

WAVETEK PARTS LIST	M9L-1 MODULE ASSY	1216-40-0012 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
4	DECAL,CAN,M171	CDB-230	W-I	2410-04-0447	1.000
5	PC ASSY, M171	M171-PC	W-I	1218-00-1350	1.000
6	INDEX STUD	A001-009	W-I	1410-00-2680	1.000
7	SCW,SBH,6-32X3/16	6-32X3/16,BH,NP	S-S	2810-17-6103	1.000
8	INT,LOWASHER,6 HW101-600	1304ZP	F-S	2810-24-6000	1.000
9	CABLE,SHIELDED COAX. 24 GA.	D WIRE,24GA	DEW	6011-40-0002	5.000
C21 C22	CAP,FT,500V,1000PF	54-794-010-102P	SPEC	1510-30-8102	2.000
C23 C24 C25	CAP,FT,500V,6.8PF	54-794-010-6892	SPEC	1510-30-1689	3.000
J1 J2	CONN JF000-004	27-21	APL	2110-03-0001	2.000
J3	CONN JF000-005	37JR116-1	S-C	2110-03-0002	1.000

WAVETEK PARTS LIST	SUMMING OUTPUT AMP, M171	1114-00-0348 PAGE: 1	B REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
3	IC SKT,8 PIN	DILB-8P-108	BURND	2112-00-0007	2.000
5	8,INT,LOWASHER HW101-800	1305ZP	F-S	2810-24-8000	1.000
6	NUT,HEX,8-32HN101-800	8007NP	F-S	2810-14-8100	1.000
C01 C02 C03 C04 C05 C06 C08 C09 C10 C11	CAP,CER,25V,.022UF	HY-525	SPR	1510-11-9223	10.000
C07 C18	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	2.000
C12	CAP,DISC,1KV,200PF	CCD-201	ARC	1510-10-1201	1.000
C13	CAP.,CHIP,360PF,10%	100B361KP200X	ATC	1510-00-2361	1.000
C14	CAP,DISC,1KV,47PF	60U2J470J	MDC	1510-10-3470	1.000
C15 C17	CAP.,CHIP,.1 MF	51C1209-B104Z	CFI	1510-00-3104	2.000
C16	CAP,CHIP,47PF	C1005C470J2GAH	UNCAR	1510-00-5470	1.000
C19	CAP,MICA,500V,470PF	DM15-471J	ARC	1510-50-0471	1.000
C20	CAP,MICA,500V,.001UF	DM15-102J	ARC	1510-50-0102	1.000
C26	CAP,DISC,1KV,.003UF	5GA-D30	SPR	1510-10-1302	1.000
CR01 CR02 CR03	DIODE,PIN	5082-3080	H-P	4805-02-0002	3.000
CR04 CR05 CR06 CR07 CR08 CR09 CR10	DIODE,SWITCHING	BA482	APX	4812-02-0004	7.000
CR11	DIODE,SCHOTTKY	5082-2800	H-P	4809-02-0001	1.000
CR12	DIODE,SIGNAL	1N914	G-E	4807-01-0914	1.000
IC01 IC02	RF AMP,WIDE BAND,400 MHZ,55 MA DC	MWA120	MOT	7000-01-2000	2.000
IC03 IC04	DUAL OP AMP	TL082CP	T-I	7000-00-8200	2.000
L01 L02 L03 L04 L05 L06	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	6.000
L07	CHOKE,COATED,39UH	08N390	JEF	1810-03-0390	1.000
L08	COIL,AIR,3-1/2 T.	1815-00-0042	W-I	1815-00-0042	1.000
Q01	TRANS QB000-034	BFR94	APX	4902-00-0940	1.000
Q02	TRANS QA054-610	2N5461	MOT	4901-05-4610	1.000
R01	RES,C,1/8W,5%,560	CF 1/8-560	ASE	4700-05-5600	1.000
R02	RES.1/8W,5,330	CF1/8-330	ASE	4700-05-3300	1.000
R03 R43	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	2.000
R04	RES,C,1/8W,5%,10	CF1/8-10	ASE	4700-05-1009	1.000
R05	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	1.000
R06	RES,C,1/4W,5%,330	CF1/4-330	ASE	4700-15-3300	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R07	RES,C,1/4,5%,27	CF1/4-27	ASE	4700-15-2709	1.000
R08	RES,C,1/4W,5%,91K	CF1/4-91K	ASE	4700-15-9102	1.000
R09 R17 R20	RES,C,1/4W,5%,5.1K	CF1/4-5.1K	ASE	4700-15-5101	3.000
R10	RES,C,1/4W,5%,15K	CF1/4-15K	ASE	4700-15-1502	1.000
R11 R12	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	2.000
R13	RES,C,1/4W,5%,18	CF 1/4-18	ASE	4700-15-1809	1.000
R14 R30	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	2.000
R15 R35	RES,C,1/8W,5%,68	CF1/8-68	ASE	4700-05-6809	2.000
R16	RES,C, 1/8W,5%, 5.1K	CF 1/8 -5.1 K	ASE	4700-05-5101	1.000
R18	RES,C,1/4W,5%,2.7	CF1/4-2.7	ASE	4700-15-2708	1.000
R19	RES.C.1/8W 5% 470	CF1/8-470	ASE	4700-05-4700	1.000
R21	RES,C,1/4W,5%,24K	CF1/4-24K	ASE	4700-15-2402	1.000
R22 R23	RES,C,1/4W,5%,1.5K	CF1/4-1.5K	ASE	4700-15-1501	2.000
R24	RES,C,1/8W,5%,33	CF-1/8-33	ASE	4700-05-3309	1.000
R25 R26	RES,C,1/8W,5%,47	CF1/8-47	ASE	4700-05-4709	2.000
R27	RES,C,1/8W,5%,15	CF-1/8-15	ASE	4700-05-1509	1.000
R28	POT,CERMET,500	89PR500	BEK	4610-00-2501	1.000
R29	RES,C,1/4W,5%,120	CF1/4-120	ASE	4700-15-1200	1.000
R31 R32	RES,C,1/4W,5%,1.2K	CF1/4-1.2K	ASE	4700-15-1201	2.000
R33	RES,C,1/4W,5%,15	CF1/4-15	ASE	4700-15-1509	1.000
R34	RES,C,1/4W,5%,270	CF1/4-270	ASE	4700-15-2700	1.000
R36	RES,C,1/8W,5%,6.2K	CF1/8-6.2K	ASE	4700-05-6201	1.000
R37	RES,C,1/8W,5%,1K RC101-210	CF1/8-1K	ASE	4700-05-1001	1.000
R38	RES,C,1/4W,5%,12K	CF1/4-12K	ASE	4700-15-1202	1.000
R39 R42	POT,20K,RP130-320	89PR20K	BEK	4610-00-2203	2.000
R40	RES,C,1/4W,5%,4.7K	CF1/4-4.7K	ASE	4700-15-4701	1.000
R41	RES,C,1/4W,5%,75K	CF1/4-75K	ASE	4700-15-7502	1.000
R44	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	1.000
R45	RES,C,1/4W,5%,1M	CF1/4-1M	ASE	4700-15-1004	1.000
R46	RES,C,1/4W,5%,68	CF1/4-68	ASE	4700-15-6809	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C01 C02 C06 C15	CAP,FT,500V,1000PF	54-794-010-102P	SPEC	1510-30-8102	4.000
C05	CAP,FT,500V,6.8PF	54-794-010-6892	SPEC	1510-30-1689	1.000
CR09 CR10	DIODE,RECT,400V	1N4004	P-C	4806-01-4004	2.000
J01	CONN JF000-004	27-21	APL	2110-03-0001	1.000
L01 L02	TOROID,10T	LA009-010	W-I	1810-05-0002	2.000
MX01	MIXER,DBL.BALANCED	CM-1	VARIL	3010-54-0001	1.000
X1	CRYSTAL,50.00000 MHZ	X33W-50.00000	W-I	2310-00-0561	1.000

WAVETEK PARTS LIST	PSK MODULATOR, M135-50	1114-00-0355 PAGE: 1	C REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C03 C04 C17 C18	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	4.000
C07 C08 C12 C27	CAP,DISC,1KV,10PF	10TCC-Q10	SPR	1510-10-0100	4.000
C09 C10 C11 C28 C29	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	5.000
C13 C23 C26	CAP,DISC,1KV,47PF	10TCC-Q47	SPR	1510-10-0470	3.000
C14	CAP,DISC,1KV,120PF	60U121M	MDC	1510-10-1121	1.000
C16	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	1.000
C19 C20	CAP,DISC,1KV,470PF	60U471M	MDC	1510-10-1471	2.000
C21	CAP,DISC,1KV,33PF	10TCC-Q33	SPR	1510-10-0330	1.000
C22	CAP,COMP,500V,3PF	QC-3PF	Q-C	1510-40-0030	1.000
C24 C25	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	2.000
CR01 CR07	DIODE,SIGNAL	1N914	G-E	4807-01-0914	2.000
CR02 CR03	DIODE,SCHOTTKY	5082-2835	H-P	4809-02-0002	2.000
CR04 CR05 CR06	DIODE,PIN	MA47047	M-A	4805-02-0003	3.000
CR08	DIODE,RECT,400V	1N4004	P-C	4806-01-4004	1.000
IC01	OP AMP	N5741CV	SIG	7000-57-4100	1.000
J02 J03	PV JUMPER	65474-002	BER	2112-10-0002	2.000
L03 L06	TORDID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
L04	COIL,AIR,14T,.200 ID	14T,PER SPEC.	ATR	1815-00-0008	1.000
L05 L11	COIL,AIR,3T,.200 ID	3T,PER SPEC.	ATR	1815-00-0002	2.000
L07	COIL,AIR,10T,.200 ID	10T,PER SPEC.	ATR	1815-00-0007	1.000
L08	COIL,AIR,4T,.200 ID	4T,PER SPEC.	ATR	1815-00-0003	1.000
L09	COL,AIR,6T,.200 ID	6T,PER SPEC.	ATR	1815-00-0004	1.000
L10 L13	COIL,AIR,8T,.200 ID	8T,PER SPEC.	ATR	1815-00-0005	2.000
L12	CHOKE,COATED,47UH	08N470	JEF	1810-03-0470	1.000
P02 P03	HEADER,STRT,2 PIN REF:2112-07-0000	2112-07-0007	W-I	2112-07-0007	2.000
Q01 Q03	TRANS QA039-040	2N3904	NAT	4901-03-9040	2.000
Q02 Q04	TRANS QA039-050	2N3905	NAT	4901-03-9050	2.000
Q05 Q06	TRANS QA050-530	2N5053	APX	4901-05-0530	2.000
R01	RES,C,1/4W,5%,1.5K	CF1/4-1.5K	ASE	4700-15-1501	1.000
R02 R11 R34 R44	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	4.000
R03 R05	RES,C,1/4W,5%,27K	CF1/4-27K	ASE	4700-15-2702	2.000
R04	RES,C,1/4W,5%,3K	CF1/4-3K	ASE	4700-15-3001	1.000

WAVETEK PARTS LIST	PC ASSY, M135-50	1218-00-0470 PAGE: 1	E REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R06 R17	RES,C,1/4W,5%,15K	CF1/4-15K	ASE	4700-15-1502	2.000
R07	RES,C,1/4W,5%,430K	CF1/4-430K	ASE	4700-15-4303	1.000
R08	RES,C,1/4W,5%,82	CF1/4-82	ASE	4700-15-8209	1.000
R09 R13 R37 R45 R46	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	5.000
R10 R12 R14	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	3.000
R15 R32	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	2.000
R16 R28	RES,C,1/4W,5%,9.1K	CF1/4-9.1K	ASE	4700-15-9101	2.000
R18 R35 R48	RES,C,1/4W,5%,6.8K	CF1/4-6.8K	ASE	4700-15-6801	3.000
R19 R29	POT,10K,RP130-310	89PR10K	BEK	4610-00-2103	2.000
R20	RES,C,1/4W,5%,39K	CF1/4-39K	ASE	4700-15-3902	1.000
R21 R36 R51	RES,C,1/4W,5%,470	CF1/4-470	ASE	4700-15-4700	3.000
R22	RES,C,1/8W,5%,33	CF-1/8-33	ASE	4700-05-3309	1.000
R23 R25 R41 R42	RES,C,1/4W,5%,200	CF1/4-200	ASE	4700-15-2000	4.000
R24	RES,C,1/4W,5%,62	CF1/4-62	ASE	4700-15-6209	1.000
R26 R27	RES,C,1/8W,5%,150	CF1/8-150	ASE	4700-05-1500	2.000
R30	RES,C,1/4W,5%,20K	CF1/4-20K	ASE	4700-15-2002	1.000
R31	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	1.000
R33 R47	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	2.000
R38	RES,C,1/4W,5%,2.2K	CF1/4-2.2K	ASE	4700-15-2201	1.000
R39 R40 R52	RES,C,1/4,5%,27	CF1/4-27	ASE	4700-15-2709	3.000
R43	RES,C,1/4W,5%,330	CF1/4-330	ASE	4700-15-3300	1.000
R49	RES,C,1/4W,5%,390	CF1/4-390	ASE	4700-15-3900	1.000
R50	RES,C,1/4W,5%,68	CF1/4-68	ASE	4700-15-6809	1.000
R53	RES,C,1/8W,5%,27	BB 2705	A-B	4705-05-2709	1.000
R57 R58	RES,C,1/8W,5%,430	BB4315	A-B	4705-05-4300	2.000
T01 T02	RF XFMR FROM:1813-00-0008	1210-41-0007	W-I	1210-41-0007	2.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CONTACT,MC000-131	08-50-0106	MOL	2113-07-0002	7.000
A01	PC ASSY,DPS10	DPS10-PC	W-I	1218-00-0170	1.000
A02	LINE CORD ASSY,DPS10	1219-40-0013	W-I	1219-40-0013	1.000
F01	FUSE,SLO BLO,1 AMP, 250V	MDL-1	BUS	2410-05-0005	1.000
J01	JACK,FEMALE,9-CKT MC000-067	09-50-3091	MOL	2113-06-0001	1.000
J101	RECEPTACLE,4 PIN	19-09-1042	MOL	2113-26-0002	1.000
Q03 Q04	PROT PWR DARLINGTON	LM395T	NAT	4902-00-3950	2.000
S01	SWITCH,SLIDE,DPDT	4021.0512	MARQ	5105-00-0011	1.000
T01	XFMR, PWR	9058	A-M	5610-00-0029	1.000

WAVETEK PARTS LIST	POWER SUPPLY,DPS10	1115-00-0017 PAGE: 1	D REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	IC SKT,8 PIN	DILB-8P-108	BURND	2112-00-0007	1.000
C01 C08	CAP,ELEC,50V,1500UF	WBR1500-50	C-D	1510-20-1152	2.000
C02 C06	CAP,DISC,100V,.005UF	TG-D50	SPR	1510-10-2502	2.000
C03 C09	CAP,ELEC,25V,100UF	TE1211	SPR	1510-20-4101	2.000
C04 C05 C07	CAP,TANT,25V,1UF	100DE105K25A2	ACI	1510-21-7010	3.000
C10 C11	CAP,ELEC,16V,10000UF	D76381	SPR	1510-21-4103	2.000
CR01	DIODE BRIDGE	MDA101	MOT	4806-02-0003	1.000
CR02 CR03	DIODE BRIDGE	MDA970-2	MOT	4806-02-0004	2.000
CR04 CR06	DIODE,SIGNAL	1N914	G-E	4807-01-0914	2.000
CR05 CR07	DIODE,RECT,400V	1N4004	P-C	4806-01-4004	2.000
IC01	VOLTAGE REFERENCE	REF-02CJ	PMI	7000-00-0200	1.000
IC02	DUAL OP AMP	TL082CP	T-I	7000-00-8200	1.000
J03 J04	CONN.,RECEPT.,3-PIN	6-86105-3	AMP	2112-25-0001	2.000
P01 P02	7-PIN LOCKING PLUG	09-65-1071	MOL	2112-05-0007	2.000
Q01	JFET,N-CHANNEL	E232	SCX	4902-00-2320	1.000
Q02	TRANS QA039-060	2N3906	T-I	4901-03-9060	1.000
R01	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	1.000
R02	RES,C,1/4W,5%,39K	CF1/4-39K	ASE	4700-15-3902	1.000
R03	RES,MF,1/8W,1%,4.87K	RN55D-4.87K	MILSP	4701-03-4871	1.000
R04 R08	POT,CERMET,200	89PR200	BEK	4610-00-2201	2.000
R05	RES,C,1/4W,5%,3.9K	CF1/43.9K	ASE	4700-15-3901	1.000
R06	RES,MF,1/8W,1%,13.0K	RN55D-13.0K	MILSP	4701-03-1302	1.000
R07 R09	RES,MF,1/8W,1%,10K	RN55D-10K	MILSP	4701-03-1002	2.000
R10 R12	RES,C,1/4W,5%,4.7K	CF1/4-4.7K	ASE	4700-15-4701	2.000
R11	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	1.000
R13	RES,C,1/4W,5%,1.2K	CF1/4-1.2K	ASE	4700-15-1201	1.000

WAVETEK PARTS LIST	PC ASSY,DPS10	1218-00-0170 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	TERM,FEMALE	02-09-1118	MOL	2113-09-0003	5.000
P01	CORD SET,18/3SVT,6FT BK,MLD,CAP,UL-APPRV	6011-80-0001	ECMC	6011-80-0001	1.000

WAVETEK PARTS LIST	LINE CORD ASSY,DPS10	1219-40-0013 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
4	HANDLE TRIM,4-7/16 REF:3210-06-0029	2810-07-0005	W-I	2810-07-0005	2.000
5	SCW,SFH,4-40X3/8	2133NP	F-S	2810-19-4106	4.000
6	SCW,SOH,6-32X3/8	2332NP	F-S	2810-21-6106	4.000
10	SCW,SRH,4-40X1/4	2012NP	F-S	2810-18-4104	5.000
11	SCW,SRH,4-40X1/2	2016NP	F-S	2810-18-4108	2.000
13	BEZEL W/FILTER 4-IN.	140-4	RMF	2410-08-0001	1.000
14	LO,WASHER,INT,4 HW101-400	1331NP	F-S	2810-24-4000	7.000

WAVETEK PARTS LIST	FRONT PANEL, 1855	1118-00-0045 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C101	CAP,NON,50V,1UF	3420-050-E105M	AER	1510-11-3105	1.000
C102	CAP,ELEC,10V,150UF	503D157M025NB	SPR	1510-20-8151	1.000
CR101 CR102	DIODE,SIGNAL	1N914	G-E	4807-01-0914	2.000
CR103 CR104 CR105 CR106 CR107 CR108 CR109 CR110 CR111 CR112 CR113 CR114 CR115	LED,RED,RECT	MV57124	MNO	4810-02-0004	13.000
DS101 DS102 DS103 DS104	LED DISPLAY,7-SEG,.30	MAN74A	MNO	2410-03-0003	4.000
IC101 IC102	HEX D FLIP FLOP STATIC SENSITIVE	CD40174BE	RCA	8004-01-7412	2.000
IC103 IC104 IC105 IC106	BCD/7-SEG DCDR STATIC SENSITIVE	CD4511DE	RCA	8000-45-1112	4.000
IC107	HEX 3-ST INVERTER	8T96	SIG	8000-08-9610	1.000
IC108	PO VOLTAGE REG,	UA7805UC	FCD	7000-78-0523	1.000
J101	PC EDGE CONN,50-CKT	TP1-251-S04	TEKA	2112-27-0002	1.000
Q101 Q102 Q103 Q104 Q105 Q106 Q107 Q108 Q109 Q110	TRANS QA053-060	2N5306	G-E	4901-05-3060	10.000
R101 R102 R103 R104 R105 R106 R107 R108 R109 R110 R111 R113	RES,C,1/4W,5%,56	CF1/4-56	ASE	4700-15-5609	12.000
R112	RES,C,1/4,5%,27	CF1/4-27	ASE	4700-15-2709	1.000
R115 R116 R117 R118 R119 R120 R121 R122 R123 R124 R125 R126 R127 R128 R129 R130 R131 R132 R133 R134 R135 R136 R137 R138 R139 R140 R141 R142 R146	RES,1/4W,5%,130	CF1/4-130	ASE	4700-15-1300	29.000
R143	RES NTWK,SIP,5-470K	605-474K	EPITK	4770-00-0010	1.000
R144	RES NTWK,SIP,9-470K	109-474J	EPITK	4770-00-0011	1.000
R145	RES NTWK,SIP,5-4.7K	605-472J	EPITK	4770-00-0003	1.000
S101 S102 S103 S104 S105 S106 S107 S108 S109 S110 S111 S112 S113 S114 S115 S116 S117 S118 S119 S120	SOLOD STATE SWITCH	1001SD4A3S	MRO	5111-00-0005	20.000

WAVETEK PARTS LIST	FRONT PANEL PC, 1855	1218-00-0550 PAGE: 1	B REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	TERMINAL,MALE	02-09-2118	MOL	2113-09-0004	4.000
P101	PLUG	19-09-2042	MOL	2113-26-0001	1.000
S121	SWITCH,TOGGLE DPDT	9201P3HZQ	C-K	5106-00-0016	1.000

WAVETEK PARTS LIST	PWR SWITCH,16-1/2	1212-00-0011 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
J201 J301 J401	PC EDGE CONN,50-CKT	TP1-251-S04	TEKA	2112-27-0002	3.000
P101	DS PC BD,ZZ484	ZZ484	W-I	1710-00-2070	1.000

WAVETEK PARTS LIST	MAIN BD 1, 1855	1218-00-0530 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
J402 J502	PC EDGE CONN,56-CKT	TP1-281-S04	TEKA	2112-27-0003	2.000

WAVETEK PARTS LIST	MAIN BD 2, 1855	1218-00-0540 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
J06	DUAL MINI-LATCH HSG, 8-PIN	65043-033	BER	2113-28-0002	1.000

WAVETEK PARTS LIST	HARNESS, 1855	1219-00-0160 PAGE: 1	C REV

		PAGE
A/D DATA MEM CD	1110-00-0080	66-67
REG CTL CD	1110-00-0100	68-69
V/H TIMING CD	1110-00-0110	70-71
PS BOARD ½	1110-00-0210	72
PS BOARD 3	1110-00-0220	73-74
PS BOARD 4	1110-00-0230	75
PS BOARD 5	1110-00-0240	76-77
MOTHER BOARD	1110-00-0320	78
PRELIMINARY	1111-40-0007	79
DC BLOCK B904	1118-40-9016	
CABLE ASSY, 5 ½ IN	1217-70-0060	80
CABLE ASSY, 3 ½ IN	1217-70-0061	
CABLE ASSY, 4 ½ IN	1217-70-0065	
PSK DEMODULATOR, M119-50	1114-00-0351	81
MODULE ASSY, M119-50	1216-40-0027	82
AMP BOARD, M119	1218-00-0430	83
OSC BOARD, M119	1218-00-0440	84
PHASE LOCK BD, M119	1218-00-0450	85-86
RF AMP/ATTEN, M117-1	1114-00-9002	87
MODULE ASSY, M117	1216-40-0023	88
ATTEN PC BOARD, M117	1218-00-0390	89
PROG PC BOARD, M117	1218-00-0400	
AMP BOARD 1, M117	1218-00-0420	90
AMP BOARD 2, M117	1218-00-0421	91
DIFF BIAS DET, M118-1	1114-00-9003	
MODULE ASSY, M118	1216-40-0025	92
PC ASSEMBLY, M118	1218-00-0500	93-94
DUMMY BASE, FOR M119	1118-00-0048	95
FRONT PANEL ASSY	1118-40-0043	
SUN SHIELD ASSY	1216-00-0013	

SECTION 6

PARTS LIST

1865B

		PAGE
65 HOUSING SUB ASSY	1216-40-0018	96
65 COVER-HSG SUB ASSY	1216-40-0019	97
CHASSIS ASSY	1216-40-0030	98
CARD CG/MTHR BD ASSY	1216-40-0032	
MODULE HARNESS	1219-00-0164	
ATTENUATOR/KEYBOARD HRNSS	1219-00-0165	
OPTION HARNESS	1219-00-0166	99
ATTEN ASSY	1219-00-0168	
CRT ASSEMBLY	1219-00-0172	
BATT INTFC,BC2-1865	1019-00-0194	100
BC-2 HEATER CORD SET	1219-40-0089	

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	PV JUMPER	65474-002	BER	2112-10-0002	6.000
2	DS PC BD ZZ502A	ZZ502A	W-I	1710-00-3030	1.000
3	IC SKT, 22 PIN	C842202	T-I	2112-00-0025	2.000
4	IC SKT,16 PIN MC000-074	DILB-16P-108	BURND	2112-00-0012	13.000
5	IC SKT,PC,14 PIN MC000-073	C931402	T-I	2112-00-0011	7.000
6	IC SKT,8 PIN	DILB-8P-108	BURND	2112-00-0007	1.000
C401 C402	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	2.000
C403 C404	CAP,TANT,25V,1UF	100DE105K25A2	ACI	1510-21-7010	2.000
C405 C406	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	2.000
C407 C408 C409 C410 C411	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	5.000
C412	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	1.000
C413	CAP,MICA,500V,.001UF	DM15-102J	ARC	1510-50-0102	1.000
IC401	QUAD NOR GATE STATIC SENSITIVE	MC14001BCP	MOT	8001-40-0110	1.000
IC402 IC413 IC422	QUAD POS. NAND	SN74LS01	T-I	8000-74-0110	3.000
IC403 IC404	QUAD D FLIP-FLOP STATIC SENSITIVE	MC74HC175N	MOT	8007-41-7511	2.000
IC405 IC407	DAC,8-BIT	DAC-08EQ	AMD	8000-00-0800	2.000
IC406	VOLTAGE REF	REF-01CJ	PMI	7000-00-0100	1.000
IC408	VOLTAGE COMPARATOR	AM686CN	AMD	8000-06-8600	1.000
IC409	REGISTER, 8/12 BIT, 5-A	AM2502PC	AMD	8000-25-0200	1.000
IC410	HEX FLIP-FLOP STATIC SENSITIVE	MC74HC174N	MOT	8007-41-7412	1.000
IC411 IC412	QUAD POS NAND STATIC SENSITIVE	MC74HC00N	MOT	8000-74-0012	2.000
IC414 IC415	SYNC 4-BIT COUNTER STATIC SENSITIVE	MC74HC161N	MOT	8007-41-6110	2.000
IC416 IC417	RAM, STATIC SENS.	CDP1822CE	RCA	8000-18-2210	2.000
IC418 IC419	QUAD 2/1 MUX STATIC SENSITIVE	CD40257BE	RCA	8004-02-5710	2.000
IC420 IC421	BUS BUFFER, 4-BIT STATIC SENSITIVE	CDP1856CE	RCA	8000-18-5610	2.000
IC423	DUAL MMV STATIC SENSITIVE	MM74HC123N	NAT	8007-41-2311	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
IC424	DUAL D, FLIP-FLOP STATIC SENSITIVE	MC14013BCP	MOT	8001-40-1310	1.000
P401 P402 P404 P405	HDR,RA,3-PIN REF:2112-08-0000	2112-08-0018	W-I	2112-08-0018	4.000
P403 P406	HEADER,R.ANGLE,2-PIN REF:2112-08-0000	2112-08-0009	W-I	2112-08-0009	2.000
R401 R418 R425	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	3.000
R402	RES,C,1/4W,5%,24K	CF1/4-24K	ASE	4700-15-2402	1.000
R403 R413 R416	RES,MF,1/8W,1%,4.99K	RN55D-4.99K	MILSP	4701-03-4991	3.000
R404	RES,C,1/4W,5%,510K	CF1/4-510K	ASE	4700-15-5103	1.000
R405 R406	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	2.000
R407 R408 R409 R410	RES,C,1/4W,5%,150	CF1/4-150	ASE	4700-15-1500	4.000
R411 R412 R414 R415	RES,MF,1/8W,1%,2.49K	RN55D-2.49K	MILSP	4701-03-2491	4.000
R417	RES NTWK,SIP,9-4.7K	109-472J	EPITK	4770-00-0014	1.000
R419 R420	RES NTWK,SIP,5-4.7K	605-472J	EPITK	4770-00-0003	2.000
R421 R422	RES NTWK,SIP,9-470K	109-474J	EPITK	4770-00-0011	2.000
R423	RES,C,1/4W,5%,470K	CF1/4-470K	ASE	4700-15-4703	1.000
R424 R428 R429 R430	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	4.000
R426	POT,100K,RP130-410	89PR100K	BEK	4610-00-2104	1.000
R427	RES,C,1/4W,5%,220K	CF1/4220K	ASE	4700-15-2203	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	PC BUS BAR, 16-PIN	ECI6102-3-8.3	ELDRE	2112-28-0009	1.000
2	PC BUS BAR, 10-PIN	ECI6102-3-5.3	ELDRE	2112-28-0004	1.000
3	IC SKT,PC,14 PIN MC000-073	C931402	T-I	2112-00-0011	7.000
4	IC SKT,16 PIN MC000-074	DILB-16P-108	BURND	2112-00-0012	19.000
6	DS PC BD ZZ500	ZZ500	W-I	1710-00-3010	1.000
C201	CAP,TANT,25V,1UF	100DE105K25A2	ACI	1510-21-7010	1.000
C202	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	1.000
C203	CAP,DISC,1KV,250PF	10TS-T25	SPR	1510-10-1251	1.000
CR201	DIODE,SIGNAL	1N914	G-E	4807-01-0914	1.000
IC201 IC202 IC203 IC204 IC205 IC206 IC207 IC208 IC209 IC210 IC211 IC212 IC223 IC224	QUAD D, REGISTER STATIC SENSITIVE	MC14076BAP	MOT	8001-40-7610	14.000
IC213	DUAL J-K FLIP-FLOP STATIC SENSITIVE	MC74HC109N	MOT	8007-41-0910	1.000
IC214	SYNC 4-BIT COUNTER STATIC SENSITIVE	MC74HC161N	MOT	8007-41-6110	1.000
IC215	HEX INVERTER STATIC SENSITIVE	MC14069BP	MOT	8001-40-6912	1.000
IC216 IC217	QUAD NAND STATIC SENSITIVE	MC14011BCP	MOT	8001-40-1112	2.000
IC218	N-BIT,1 OF 8 DECODER STATIC SENSITIVE	CDP1853CE	RCA	8000-18-5310	1.000
IC219	QUAD AND GATE STATIC SENSITIVE	MC14081BCP	MOT	8001-40-8110	1.000
IC220	QUAD POS NAND STATIC SENSITIVE	MC74HC00N	MOT	8000-74-0012	1.000
IC221	DUAL D, FLIP-FLOP STATIC SENSITIVE	MC14013BCP	MOT	8001-40-1310	1.000
IC222 IC225	SYNC 4-BIT UP/DN CTR	SN74LS169N	T-I	8007-41-6910	2.000
IC226	HEX INVERTER, STATIC SENSITIVE	MC74HC04N	MOT	8000-74-0411	1.000
J201	PV JUMPER	65474-002	BER	2112-10-0002	1.000
P201	HDR,RA,3-PIN REF:2112-08-0000	2112-08-0018	W-I	2112-08-0018	1.000
R201 R202	RES NTWK,SIP,9-470K	109-474J	EPITK	4770-00-0011	2.000
R203 R204	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	2.000
R205	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	1.000

WAVETEK PARTS LIST	REG CTL CD,1865	1110-00-0100 PAGE: 1	D REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R206	RES,C,1/4W,5%,470K	CF1/4-470K	ASE	4700-15-4703	1.000
SW201	SWITCH,SLIDE	1101M2AB	C-K	5105-00-0010	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
2	IC SOCKET,20-PIN	C842002	T-I	2112-00-0020	3.000
3	IC SKT,16 PIN MC000-074	DILB-16P-108	BURND	2112-00-0012	20.000
4	IC SKT,PC,14 PIN MC000-073	C931402	T-I	2112-00-0011	5.000
5	DS PC BD ZZ499B	ZZ499B	W-I	1710-00-3000	1.000
C101	CAP,MICA,500V,100PF	DM15-101J	C-D	1510-50-0101	1.000
C102	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	1.000
C103 C104	CAP,MICA,500V,.001UF	DM15-102J	ARC	1510-50-0102	2.000
C105	CAP,DISC,1KV,15PF	10TCC-Q15	SPR	1510-10-0150	1.000
IC100	PROM,1865,IC000 FROM:8007-44-7100	8410-00-0005	W-I	8410-00-0005	1.000
IC101 IC103 IC104 IC107 IC123 IC124 IC126 IC127	SYNC 4-BIT COUNTER STATIC SENSITIVE	MC74HC161N	MOT	8007-41-6110	8.000
IC102	PROM,1865,IC102 FROM:8007-44-7200	8410-00-0006	W-I	8410-00-0006	1.000
IC105 IC106	QUAD D FLIP-FLOP STATIC SENSITIVE	MC74HC175N	MOT	8007-41-7511	2.000
IC108 IC109 IC111 IC112 IC116	BIN, 4-BIT, CTR. STATIC SENSITIVE	MC14161BCP	MOT	8001-41-6110	5.000
IC110	QUAD AND GATE STATIC SENSITIVE	MC14081BCP	MOT	8001-40-8110	1.000
IC113	HEX INVERTER	SN74LS05N	T-I	8000-74-0510	1.000
IC114	QUAD POS NAND STATIC SENSITIVE	MC74HC00N	MOT	8000-74-0012	1.000
IC115	PROM,1865,IC115 FROM:8007-44-7200	8410-00-0007	W-I	8410-00-0007	1.000
IC117	DATA SEL/MPXR STATIC SENSITIVE	MM74HC151N	NAT	8007-41-5111	1.000
IC118	QUAD POS. NAND	SN7400	T-I	8000-74-0001	1.000
IC119	QUAD NAND STATIC SENSITIVE	MC14011BCP	MOT	8001-40-1112	1.000
IC120 IC121 IC122 IC125	QUAD 2-INPUT MUX STATIC SENSITIVE	MC74HC157N	MOT	8007-41-5712	4.000
Q101 Q102 Q103 Q104 Q105 Q106 Q107 Q108 Q109	TRANS QA039-060	2N3906	T-I	4901-03-9060	9.000
R101 R103	RES,C,1/4W,5%,3.3K	CF1/4-3.3K	ASE	4700-15-3301	2.000
R102 R104	RES,C,1/4W,5%,1.2K	CF1/4-1.2K	ASE	4700-15-1201	2.000
R105 R109 R110 R111 R146	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	5.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R106 R108	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	2.000
R107 R149	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	2.000
R112 R117 R120 R124 R128 R132 R137 R139 R143	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	9.000
R113 R115 R119 R125 R127 R133 R135 R140 R142	RES,C,1/4W,5%,270	CF1/4-270	ASE	4700-15-2700	9.000
R114 R116 R121 R126 R129 R134 R136 R141 R144	RES,C,1/4W,5%,68	CF1/4-68	ASE	4700-15-6809	9.000
R118 R122 R123 R130 R131 R138 R145 R147 R148	POT,1K,RP130-210	89PR1K	BEK	4610-00-2102	9.000
X1	CRYSTAL, 7.16850 MHZ	X32W-7.16850	W-I	2310-00-0891	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C01 C03	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	2.000
C02 C04	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	2.000
C05	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	1.000
C06	CAP,TANT,25V.10UF	TIM106K025P0V	MAL	1510-21-6100	1.000
C07 C08 C09 C10 C11 C12 C13 C14	CAP,TANT,10V,220UF	T310D227-010AS	UNCAR	1510-22-5221	8.000
CR01 CR02 CR03	DIODE,SIGNAL	1N914	G-E	4807-01-0914	3.000
F01	FUSE,SLO-BLO,1-AMP	301001	LIT	2410-05-1006	1.000
IC01	DUAL OP AMP,MOT	MC1458CP1-MOT	MOT	7000-14-5801	1.000
IC02	SWITCHMODE REGULATOR	MC3420P	MOT	7000-34-2000	1.000
IC03	SWITCH REG	PIC 00	UNIT	7000-06-0000	1.000
L01	TORROID, 270-UH FROM:1810-00-0014	1810-06-2700	W-I	1810-06-2700	1.000
Q01	TRANS QA039-050	2N3905	NAT	4901-03-9050	1.000
Q02	TRANS QA039-040	2N3904	NAT	4901-03-9040	1.000
R01	RES,C,1/4W,5%,15K	CF1/4-15K	ASE	4700-15-1502	1.000
R02	POT 5K FROM:4610-00-7502	4610-00-5202	W-I	4610-00-4502	1.000
R03	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	1.000
R04	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	1.000
R05 R07 R08	RES,C,1/4W,5%,20K	CF1/4-20K	ASE	4700-15-2002	3.000
R06 R10 R14	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	3.000
R09 R11 R12 R17	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	4.000
R13	RES,C,1/4W,5%,5.1K	CF1/4-5.1K	ASE	4700-15-5101	1.000
R15	RES,C,1/4W,5%,6.8K	CF1/4-6.8K	ASE	4700-15-6801	1.000
R16	RES,MF,1/8W,1%,13.0K	RN55D-13.0K	MILSP	4701-03-1302	1.000
R18	RES,C,1/4W,5%,330	CF1/4-330	ASE	4700-15-3300	1.000
R19	RES,WW,3W,5%,0.3-OHM	43JR30	OHM	4702-55-3007	1.000

WAVETEK PARTS LIST	PS BOARD 1/2, 1865	1110-00-0210 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C01 C02 C04 C07 C08	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	5.000
C03	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	1.000
C05	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	1.000
C06	CAP,TANT,25V.10UF	TIM106K025P0V	MAL	1510-21-6100	1.000
C09 C10 C11 C12	CAP,TANT,35V,47UF	T310D476-035AS	UNCAR	1510-22-4470	4.000
C13 C14 C15 C16	CAP,TANT,10V,220UF	T310D227-010AS	UNCAR	1510-22-5221	4.000
CR01 CR02 CR03 CR04	DIODE,SIGNAL	1N914	G-E	4807-01-0914	4.000
CR05 CR06	DIODE,RECT,50V	IN5802	UNIT	4806-01-5802	2.000
F01	FUSE,SLO-BLO,1-AMP	301001	LIT	2410-05-1006	1.000
IC01 IC03	DUAL OP AMP,MOT	MC1458CP1-MOT	MOT	7000-14-5801	2.000
IC02	SWITCHMODE REGULATOR	MC3420P	MOT	7000-34-2000	1.000
IC04	HEX INVERTER STATIC SENSITIVE	MC14069BP	MOT	8001-40-6912	1.000
L01 L02	TORROID, 135-UH FROM:1810-00-0013	1810-06-1350	W-I	1810-06-1350	2.000
Q01	TRANS QA039-050	2N3905	NAT	4901-03-9050	1.000
Q02	TRANS QA039-040	2N3904	NAT	4901-03-9040	1.000
Q03	TRANS QA040-300	2N4030	NAT	4901-04-0300	1.000
Q04	POWER,FET SCX VN46AF SCX, STATIC SENS.	VN46AF	SCX	4902-00-0460	1.000
R01 R15	RES,C,1/4W,5%,6.8K	CF1/4-6.8K	ASE	4700-15-6801	2.000
R02	POT 5K FROM:4610-00-7502	4610-00-5202	W-I	4610-00-4502	1.000
R03 R09 R11 R12 R17 R18 R21 R22 R23 R26	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	10.000
R04	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	1.000
R05 R27	RES,C,1/4W,5%,3.9K	CF1/43.9K	ASE	4700-15-3901	2.000
R06 R07 R10 R14 R19 R24	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	6.000
R08	RES,C,1/4W,5%,68K	CF1/4-68K	ASE	4700-15-6802	1.000
R13 R29 R30	RES,C,1/4W,5%,5.1K	CF1/4-5.1K	ASE	4700-15-5101	3.000
R16	RES,MF,1/8W,1%,13.0K	RN55D-13.0K	MILSP	4701-03-1302	1.000
R20	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	1.000
R25	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	1.000
R28	POT,2K,RP144-220 FROM:4610-00-7202	4610-00-4202	W-I	4610-00-4202	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R31	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	1.000
R32 R33	RES,WW,3W,5%,0.3-OHM	43JR30	OHM	4702-55-3007	2.000

WAVETEK PARTS LIST	PS BOARD 3, 1865	1110-00-0220 PAGE: 2	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C01 C02 C04 C07 C08	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	5.000
C03	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	1.000
C05	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	1.000
C06	CAP,TANT,25V.10UF	TIM106K025P0V	MAL	1510-21-6100	1.000
C09 C10 C11 C12 C13 C14 C15 C16	CAP,TANT,20V,100UF	T310D107-020AS	UNCAR	1510-22-3101	8.000
CR01 CR02 CR03 CR04	DIODE,SIGNAL	1N914	G-E	4807-01-0914	4.000
CR05 CR06	DIODE,RECT,50V	IN5802	UNIT	4806-01-5802	2.000
F-01	FUSE, AGA,32V 2AMP	AGA-2	BUS	2410-05-0030	1.000
IC01 IC03	DUAL OP AMP,MOT	MC1458CP1-MOT	MOT	7000-14-5801	2.000
IC02	SWITCHMODE REGULATOR	MC3420P	MOT	7000-34-2000	1.000
IC04	HEX INVERTER STATIC SENSITIVE	MC14069BP	MOT	8001-40-6912	1.000
L01 L02	TORROID, 135-UH FROM:1810-00-0013	1810-06-1350	W-I	1810-06-1350	2.000
Q01	TRANS QA039-050	2N3905	NAT	4901-03-9050	1.000
Q02	TRANS QA039-040	2N3904	NAT	4901-03-9040	1.000
Q03	TRANS QA040-300	2N4030	NAT	4901-04-0300	1.000
Q04	POWER,FET SCX VN46AF SCX, STATIC SENS.	VN46AF	SCX	4902-00-0460	1.000
R01 R15	RES,C,1/4W,5%,6.8K	CF1/4-6.8K	ASE	4700-15-6801	2.000
R02 R28	POT 5K FROM:4610-00-7502	4610-00-5202	W-I	4610-00-4502	2.000
R03 R09 R11 R12 R17 R18 R21 R22 R23 R26 R27	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	11.000
R04	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	1.000
R05	RES,C,1/4W,5%,3.9K	CF1/43.9K	ASE	4700-15-3901	1.000
R06 R07 R10 R14 R19 R24	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	6.000
R08	RES,C,1/4W,5%,68K	CF1/4-68K	ASE	4700-15-6802	1.000
R13 R29 R30	RES,C,1/4W,5%,5.1K	CF1/4-5.1K	ASE	4700-15-5101	3.000
R16	RES,MF,1/8W,1%,13.0K	RN55D-13.0K	MILSP	4701-03-1302	1.000
R20	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	1.000
R25	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	1.000
R31	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	1.000
R32 R33	RES,WW,3W,5%,0.3-OHM	43JR30	OHM	4702-55-3007	2.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C01 C04 C06 C14	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	4.000
C02	CAP,TANT,25V,10UF	TIM106K025P0V	MAL	1510-21-6100	1.000
C03	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	1.000
C05	CAP,DISC,1KV,.005UF	5GA-D50	SPR	1510-10-1502	1.000
C07 C08 C09 C10	CAP,TANT,16V,150UF	T353M157K016AS	UNCAR	1510-22-6151	4.000
C11 C12 C13	CAP,TANT,25V,68UF	T353L686K025AS	UNCAR	1510-22-7680	3.000
CR01 CR02 CR03 CR05 CR06 CR07 CR08 CR09	DIODE,SIGNAL	1N914	G-E	4807-01-0914	8.000
CR04	DIODE,RECT,50V	IN5802	UNIT	4806-01-5802	1.000
F01	FUSE,SLO-BLO,5-AMP	301-005	LIT	2410-05-1008	1.000
IC01 IC04	DUAL OP AMP,MOT	MC1458CP1-MOT	MOT	7000-14-5801	2.000
IC02	SWITCHMODE REGULATOR	MC3420P	MOT	7000-34-2000	1.000
IC03	SWITCHING REGULATOR	PIC 610	UNIT	7000-06-1000	1.000
K01 K02	RELAY,SEALED,12VDC	HB1E-DC12V	ARW-M	4510-00-0007	2.000
L01	TORROID, 270-UH FROM:1810-00-0014	1810-06-2700	W-I	1810-06-2700	1.000
Q01	TRANS QA039-050	2N3905	NAT	4901-03-9050	1.000
Q02	TRANS QA040-300	2N4030	NAT	4901-04-0300	1.000
Q03 Q04 Q05	TRANS QA039-040	2N3904	NAT	4901-03-9040	3.000
R01 R18	RES,C,1/4W,5%,15K	CF1/4-15K	ASE	4700-15-1502	2.000
R02	POT 5K FROM:4610-00-7502	4610-00-5202	W-I	4610-00-4502	1.000
R03	RES,C,1/4W,5%,9.1K	CF1/4-9.1K	ASE	4700-15-9101	1.000
R04	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	1.000
R05 R07 R10 R32	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	4.000
R06 R09	RES,C,1/4W,5%,6.8K	CF1/4-6.8K	ASE	4700-15-6801	2.000
R08	RES,MF,1/8W,1%,13.0K	RN55D-13.0K	MILSP	4701-03-1302	1.000
R11 R12 R16 R34 R38	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	5.000
R13	RES,C,1/4W,5%,560	CF1/4-560	ASE	4700-15-5600	1.000
R14 R22 R41	RES,C,1/4W,5%,5.1K	CF1/4-5.1K	ASE	4700-15-5101	3.000
R15	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	1.000
R17	RES,C,1/4W,5%,8.2K	CF1/4-8.2K	ASE	4700-15-8201	1.000
R19	RES,C,1/4W,5%,75K	CF1/4-75K	ASE	4700-15-7502	1.000
R20	RES,C,1/4W,5%,180K	CF1/4-180K	ASE	4700-15-1803	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R21	RES,C,1/8W,5%,1M	CF1/8-1M	ASE	4700-05-1004	1.000
R23 R25 R29 R31	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	4.000
R24	POT,20K,RP144-320 FROM:4610-00-7203	4610-00-4203	W-I	4610-00-4203	1.000
R26 R33	RES,C,1/4W,5%,20K	CF1/4-20K	ASE	4700-15-2002	2.000
R27 R39	RES,C,1/4W,5%,200K	CF1/4-200K	ASE	4700-15-2003	2.000
R28	RES,C,1/4W,5%,51K	CF1/4-51K	ASE	4700-15-5102	1.000
R30	RES,C,1/4W,5%,1M	CF1/4-1M	ASE	4700-15-1004	1.000
R35	RES,WW,3W,5%,0.3-OHM	43JR30	OHM	4702-55-3007	1.000
R36 R37	RES,C,1/4W,5%,33	CF1/4-33	ASE	4700-15-3309	2.000
R40	RES,C,1/4W,5%,3.9K	CF1/43.9K	ASE	4700-15-3901	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	DS PC BD ZZ498B	ZZ498B	W-I	1710-00-2090	1.000
9	FERR. BEAD,LC000-009	K5-001-00/3B	FRXC	1813-00-0007	80.000
12	SCW,SBH,4-40X3/16	4021NP-3/16	F-S	2810-17-4103	2.000
13	LO,WASHER,INT,4 HW101-400	1331NP	F-S	2810-24-4000	2.000
C01 C02 C03 C04 C05 C06 C07 C08 C09 C10 C11 C12 C13	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	13.000
J01 J11 J12 J19 J20 J21 J22 J23	PC EDGE CONN,24-CKT	TP3-121-S04	TEKA	2112-27-0005	8.000
J02 J03 J04 J05 J06 J07 J08	PC EDGE CONN,50-CKT	TP1-251-S04	TEKA	2112-27-0002	7.000
L01 L02 L03 L04 L05 L06 L07 L08 L09 L10 L11 L12 L13 L14 L15 L16	RF CHOKE,REF ONLY	CHOKE	W-I	1819-99-9999	16.000
P14	HDR,RA,18-PIN REF:2112-08-0005	2112-08-0015	W-I	2112-08-0015	1.000
P15 P17	HDR,,RA,14-PIN REF:2112-08-0000	2112-08-0016	W-I	2112-08-0016	2.000
P16	HEADER,R.ANGLE,8-PIN REF:2112-08-0000	2112-08-0006	W-I	2112-08-0006	1.000
P18	HEADER,R.ANGLE,2-PIN REF:2112-08-0000	2112-08-0009	W-I	2112-08-0009	1.000
P25	PLUG,RA,4-PIN	09-75-1041	MOL	2112-06-0006	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
B904	DC BLOCK B904	B904	W-I	1118-40-9016	1.000
W01	CABLE ASSY 6IN	WXB904	W-I	1217-70-9014	1.000
W02	CABLE ASSY, 5 1/2 IN	1217-70-0060	W-I	1217-70-0060	1.000
W03	CABLE ASSY, 4 1/4 IN	WX1865-W3	W-I	1217-70-0065	1.000
W04 W05	CABLE ASSY, 3 1/2 IN	WX1865-W4	W-I	1217-70-0061	2.000

WAVETEK PARTS LIST	PRELIMINARY,1865B	1111-40-0007 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	INSRT,BNC,M,75 OHM PER B/P	1414-00-0019	W-I	1414-00-0019	1.000
2	COVER,DC BLOCK B904	1414-00-9042	W-I	1414-00-9042	1.000
3	CAN,.734X2.172X.73 STEEL,HOT TIN DIP	HU-5361-ST	HUD	3210-08-0022	1.000
4	DECAL, DC BLOCK B904	2414-01-1001	W-I	2414-01-1001	1.000
5	CABLE, COAX,RG302/U	RG302/U	TIMES	6011-40-0019	2.000
C1 C2	CAP,DISC,1KV,.003UF	5GA-D30	SPR	1510-10-1302	2.000
L01	CHOKE,COATED,10UH	08N100	JEF	1810-03-0100	1.000
P1	CONN JF000-004	27-21	APL	2110-03-0001	1.000
P2	CONN,BNC-M,75,CABLE	28P189-2	S-C	2110-01-0002	1.000

WAVETEK PARTS LIST	DC BLOCK B904	1118-40-9016 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CONN,BNC-M,75,CABLE	28P189-1	S-C	2110-01-0001	2.000

WAVETEK PARTS LIST	CABLE ASSY, 5 1/2 IN	1217-70-0060 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CONN JF000-008	27-25	APL	2110-03-1004	2.000

WAVETEK PARTS LIST	CABLE ASSY, 3 1/2 IN	1217-70-0061 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CONN JF000-008	27-25	APL	2110-03-1004	1.000
2	CONN,BNC-M,75,CABLE	28P189-1	S-C	2110-01-0001	1.000

WAVETEK PARTS LIST	CABLE ASSY, 4 1/4 IN	1217-70-0065 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
10	COVER PER B/P	A001-910	W-I	1410-00-2380	1.000
11	COVER PER B/P	A001-911	W-I	1410-00-2390	1.000
16	SCW,SBH,2-56X3/16	4001NP	F-S	2810-17-2103	15.000
17	LOWASHER,INT 2	1330NP	F-S	2810-24-2000	15.000
23	FISHPAPER;PHASE LOCK PER B/P	A001-963	W-I	1410-00-9440	1.000
24	FISHPAPER; BANDPASS PER B/P	A001-964	W-I	1410-00-9450	1.000
25	OSC FISH PAPER B/P	A001-965	W-I	1410-00-9460	1.000
C01 C02 C03	CAP,FT,500V,2200PF	4420-2200PF	AER	1510-31-1222	3.000
C04 C05	CAP,FT,500V,4.7PF	4420-4.7PF	AER	1510-31-4479	2.000
C13	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	1.000
CR01 CR02	DIODE,RECT,400V	1N4004	P-C	4806-01-4004	2.000
L01	TORDID,10T,1-1/2L	LA009-010-2	W-I	1810-05-0005	1.000
L02 L03	TORDID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
L04	CHOKE,COATED,47UH	08N470	JEF	1810-03-0470	1.000
MX01	MIXER,DBL.BALANCED	CM-1	VARIL	3010-54-0001	1.000
R01	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	1.000
ZA01	AMP BOARD, M119	M119-50-AMP BD	W-I	1218-00-0430	1.000
ZA02	OSC BOARD, M119	M119-50-OSC BD	W-I	1218-00-0440	1.000
ZA03	PHASE LOCK BD, M119	M119-PH LK BD	W-I	1218-00-0450	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	FRAME,M119-50 FROM:1410-30-0700	1414-30-1035	W-I	1414-30-1035	1.000
2	INT,LOWASHER,6 HW101-600	1304ZP	F-S	2810-24-6000	1.000
3	CONN JF000-004	27-21	APL	2110-03-0001	1.000
4	BASE,M119 FROM:3210-08-0033	1414-30-1018	W-I	1414-30-1018	1.000
5	INDEX STUD	A001-009	W-I	1410-00-2680	1.000
8	SCW,SBH,6-32X3/16	6-32X3/16,BH,NP	S-S	2810-17-6103	1.000
9	PSK DEMOD CHASSIS CTR PLATE B/P	1410-30-1690	W-I	1410-30-1690	1.000
12	SHIELD PER B/P	A001-912	W-I	1410-00-2430	1.000
13	SHIELD PER B/P	A001-913	W-I	1410-00-2440	1.000
14	SHIELD PER B/P	A01-915	W-I	1410-00-2480	1.000
18	STANDOFF, SWAGE, 3/16 X 1/8	SS151-1A-17	UNIC	2810-05-0009	15.000
26	CAP,FT,500V,6.8PF	54-794-010-6892	SPEC	1510-30-1689	3.000
27	CAP,FT,500V,1000PF	54-794-010-102P	SPEC	1510-30-8102	3.000

WAVETEK PARTS LIST	MODULE ASSY,M119-50	1216-40-0027 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C101 C110 C113	CAP,DISC,1KV,470PF	60U471M	MDC	1510-10-1471	3.000
C102 C111	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	2.000
C103	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	1.000
C104 C112	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	2.000
C105	CAP,DISC,1KV,25PF	60C0G250J	MDC	1510-10-0250	1.000
C106 C108	CAP,COMP,500V,.47PF	MC-.47PF	Q-C	1510-40-1478	2.000
C107	CAP,DISC,1KV,20PF	60C0G200J	MDC	1510-10-0200	1.000
C109	CAP,DISC,1KV,15PF	10TCC-Q15	SPR	1510-10-0150	1.000
L101 L107	TORDID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
L102	COIL,AIR,9T,.200 ID	9T,PER SPEC.	ATR	1815-00-0006	1.000
L103	COL,AIR,6T,.200 ID	6T,PER SPEC.	ATR	1815-00-0004	1.000
L104	COIL,AIR,16T,.200 ID	16T,PER SPEC.	ATR	1815-00-0009	1.000
L105	COIL,AIR,19T,.200 ID	19T,PER SPEC.	ATR	1815-00-0010	1.000
L106	COIL,AIR,2T,0.200 ID	2T,PER SPEC.	ATR	1815-00-0001	1.000
Q101 Q102	TRANS QA050-530	2N5053	APX	4901-05-0530	2.000
R101	RES,C,1/8W,5%,6.8K	CF1/8-6.8K	ASE	4700-05-6801	1.000
R102 R106	RES,C,1/8W,5%,20K	CF1/8-20K	ASE	4700-05-2002	2.000
R103 R107	RES,C,1/8W,5%,10	CF1/8-10	ASE	4700-05-1009	2.000
R104 R108	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	2.000
R105	RES,C,1/8W,5%,240	CF1/8-240	ASE	4700-05-2400	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C201	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	1.000
C202 C203	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	2.000
C204	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	1.000
C205	CAP,MICA,500V,.001UF	DM15-102J	ARC	1510-50-0102	1.000
C206	CAP,MICA,300V,15PF	DM-5CC150J	ARC	1510-50-1150	1.000
C207	CAP,MICA,300V,47PF	ADM-5-470J	ARC	1510-50-1470	1.000
C208	CAP,MICA,300V,5PF	DM-5CC050D	ARC	1510-50-1509	1.000
C209	CAP,MICA,300V,10PF	DM-5CC100J	ARC	1510-50-1100	1.000
C210	CAP,TANT,25V,1UF	100DE105K25A2	ACI	1510-21-7010	1.000
CR201	DIODE,VARACTOR	BB205B	APX	4803-02-0004	1.000
L201 L202	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
L203	COIL,AIR,16T,.200 ID	16T,PER SPEC.	ATR	1815-00-0009	1.000
L204	COIL,AIR,3T,.200 ID	3T,PER SPEC.	ATR	1815-00-0002	1.000
Q201	TRANS QA050-530	2N5053	APX	4901-05-0530	1.000
R201	RES,C,1/8W,5%,9.1K	CF1/8-9.1K	ASE	4700-05-9101	1.000
R202	RES,C, 1/8W,5%, 5.1K	CF 1/8 -5.1 K	ASE	4700-05-5101	1.000
R203	RES.1/8W,5,330	CF1/8-330	ASE	4700-05-3300	1.000
R204	RES,C,1/8W,5%,47	CF1/8-47	ASE	4700-05-4709	1.000
R205	RES,C,1/8W,5%,20K	CF1/8-20K	ASE	4700-05-2002	1.000
R206 R208	RES.C.1/8W 5% 470	CF1/8-470	ASE	4700-05-4700	2.000
R207	RES,C,1/8W,5%,27	CF1/8-27	ASE	4700-05-2709	1.000
R209	RES,C,1/8W,5%,1.8K	CF1/8-1.8K	ASE	4700-05-1801	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C301 C302	CAP,MICA,100V,250PF	ADM-10CA251J	ARC	1510-50-5251	2.000
C303	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	1.000
C304 C305 C307 C312 C313 C315 C316 C318	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	8.000
C306 C308 C309 C310 C317	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	5.000
C311	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	1.000
C314	CAP,DISC,1KV,270PF	60U271M	MDC	1510-10-1271	1.000
C319 C320	CAP,MICA,500V,.001UF	DM15-102J	ARC	1510-50-0102	2.000
C321	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	1.000
CR301 CR302 CR303	DIODE,SIGNAL	1N914	G-E	4807-01-0914	3.000
IC301	IF AMP	MC1350P	MOT	7000-13-5000	1.000
IC302	PHASE DETECTOR	MC4044P	MOT	8000-40-4400	1.000
IC303	OP AMP,DUAL,3MHZ	NE5530	SIG	7000-55-3000	1.000
IC304	QUAD NAND STATIC SENSITIVE	MC14011BCP	MOT	8001-40-1112	1.000
L301 L303	CHOKE,COATED,6.8UH	08N6R8	JEF	1810-03-0689	2.000
L302	CHOKE,COATED,3.9UH	08N3R9	JEF	1810-03-0399	1.000
L304 L305	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
Q301	TRANS QA050-530	2N5053	APX	4901-05-0530	1.000
Q302	TRANS QA039-060	2N3906	T-I	4901-03-9060	1.000
R301	RES,C,1/4W,5%,2.7K	CF1/4-2.7K	ASE	4700-15-2701	1.000
R301	RES,C,1/4W,5%,7.5K	CF1/4-7.5K	ASE	4700-15-7501	1.000
R302 R309 R323 R324 R329 R331	RES,C,1/4W,5%,20K	CF1/4-20K	ASE	4700-15-2002	6.000
R303 R315 R332	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	3.000
R304 R311 R319 R325	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	4.000
R305	RES,C,1/4W,5%,5.6K	CF1/4-5.6K	ASE	4700-15-5601	1.000
R306	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	1.000
R307	RES,C,1/4W,5%,200	CF1/4-200	ASE	4700-15-2000	1.000
R308	RES,C,1/4W,5%,470	CF1/4-470	ASE	4700-15-4700	1.000
R310	RES,C,1/4W,5%,180	CF1/4-180	ASE	4700-15-1800	1.000
R312 R314	RES,MF,1/8W,1%,1K	RN55D-1K	MILSP	4701-03-1001	2.000
R313	RES,C,1/4W,5%,2.7	CF1/4-2.7	ASE	4700-15-2708	1.000
R316	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R317	POT,2K,RP144-220 FROM:4610-00-7202	4610-00-4202	W-I	4610-00-4202	1.000
R318	RES,C,1/4W,5%,27K	CF1/4-27K	ASE	4700-15-2702	1.000
R321	RES,MF,1/8W,1%,4.99K	RN55D-4.99K	MILSP	4701-03-4991	1.000
R322	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	1.000
R326	RES,MF,1/8W,1%,11.3K	RN55D-11.3K	MILSP	4701-03-1132	1.000
R327	RES,MF,1/8W,1%,1.50K	RN55D-1.50K	MILSP	4701-03-1501	1.000
R328 R330	RES,C,1/8W,5%,100K	CF1/8-100K	ASE	4700-05-1003	2.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
8	AMP BOARD 1, M117	M117-AMP BD 1	W-I	1218-00-0420	1.000
10	SHIELD,RF PER B/P	A001-922	W-I	1410-00-9050	1.000
11	ATTEN PC BOARD, M117	M117-ATT BD	W-I	1218-00-0390	1.000
12	SHIELD PER B/P	A001-923	W-I	1410-00-9060	1.000
13	PROG PC BOARD, M117	M117-PROG BD	W-I	1218-00-0400	1.000
14	SCW,SBH,2-56X1/8	4000NP	F-S	2810-17-2102	16.000
17	FISH PAPER PER B/P	A001-961	W-I	1410-00-9310	1.000
18	AMP BOARD 2, M117	M117-AMP BD 2	W-I	1218-00-0421	1.000
19	COVER PER B/P	A001-924	W-I	1410-00-9070	2.000
20	COVER PR B/P	A001-926	W-I	1410-00-9090	1.000
21	SCW,SBH,2-56X3/16	4001NP	F-S	2810-17-2103	4.000
C08 C09 C10 C11 C12 C13 C14	CAP,FT,500V,2200PF	4420-2200PF	AER	1510-31-1222	7.000
C15	CAP,COMP,500V,1PF	QC-1PF	Q-C	1510-40-0010	1.000
R313 R315	RES,C,1/4W,5%,2.7	CF1/4-2.7	ASE	4700-15-2708	2.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CHASSIS,M117 FROM:1410-00-3360	1414-30-1009	W-I	1414-30-1009	1.000
2	BASE,M117 FROM:3210-08-0033	1414-30-1008	W-I	1414-30-1008	1.000
3	INDEX STUD	A001-009	W-I	1410-00-2680	1.000
4	NUT,6-32X1/4HN101-600	8005NP	F-S	2810-14-6100	2.000
5	INT,LOWASHER,6 HW101-600	1304ZP	F-S	2810-24-6000	2.000
6	SCW,SBH,6-32X1/4	6-32X1/4,UC,BH,NP	S-S	2810-17-6104	1.000
7	SHIELD PER B/P	A001-920	W-I	1410-00-9080	2.000
9	SHIELD PER B/P	A001-921	W-I	1410-00-9040	1.000
16	STANDOFF, SWAGE, 3/16 X 1/8	SS151-1A-17	UNIC	2810-05-0009	4.000
21	CONN JF000-004	27-21	APL	2110-03-0001	2.000
22	CLOVERLEAF FTE-12 HT101-000	011-6808-000-59-9	SEL	2112-18-0001	2.000
23	CAP,FT,500V,470PF	FA5C-4712	A-B	1510-30-0471	7.000

WAVETEK PARTS LIST	MODULE ASSY,M117	1216-40-0023 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C301 C302 C303 C304	CAP.,CHIP,.1 MF	51C1209-B104Z	CFI	1510-00-3104	4.000
CR301 CR302 CR303 CR304 CR305 CR306	DIODE,SWITCHING	BA482	APX	4812-02-0004	6.000
R301 R302 R304 R305	RES,C,1/8W,5%,1K RC101-210	CF1/8-1K	ASE	4700-05-1001	4.000
R303	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	1.000
R306 R307	RES,L-A,1/4W,1%,143	SPS-N-347-143	IRC	4741-14-3008	2.000
R308	RES,L-A,1/4W,1%,107	SPS-N-347-107	IRC	4741-10-7008	1.000
R309 R310	RES,L-A,1/4W,1%,90.9	SPS-N-347-90.9	IRC	4741-90-9007	2.000
R311	RES,L-A,1/4W,1%,374	SPS-N-347-374	IRC	4741-37-4008	1.000
R312 R314	RES,C,1/8W,5%,2K	CF1/8-2K	ASE	4700-05-2001	2.000

WAVETEK PARTS LIST	ATTEN PC BOARD, M117	1218-00-0390 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C401 C402 C404 C405 C408 C409	CAP,TANT,25V,1UF	100DE105K25A2	ACI	1510-21-7010	6.000
C403 C406 C407	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	3.000
IC401 IC402 IC403	OP AMP	N5741CV	SIG	7000-57-4100	3.000
R401 R407 R418	RES,C,1/4W,5%,27K	CF1/4-27K	ASE	4700-15-2702	3.000
R402 R408 R417	RES,C,1/4W,5%,6.8K	CF1/4-6.8K	ASE	4700-15-6801	3.000
R403 R409 R416	RES,C,1/4W,5%,30K	CF1/4-30K	ASE	4700-15-3002	3.000
R404 R406 R410 R412 R413 R415	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	6.000
R405 R411 R414 R419 R420 R422 R423	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	7.000
R421	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	1.000

WAVETEK PARTS LIST	PROG PC BOARD, M117	1218-00-0400 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C101 C102 C103 C104 C105 C106 C107 C108 C109	CAP.,CHIP,.1 MF	51C1209-B104Z	CFI	1510-00-3104	9.000
C110	CAP,DISC,1KV,10PF	10TCC-Q10	SPR	1510-10-0100	1.000
C111	CAP,VAR,3.5-13PF	7S-TRIKO-02-3.5-13PF	STR	1510-70-0130	1.000
L101 L102 L103 L104	TORDID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	4.000
Q101 Q102 Q103 Q104	TRANS QB000-035	BFR90	APX	4902-00-0900	4.000
R101 R106 R107 R108	RES,C,1/8W,5%,240	BB-2415	*****	4705-05-2400	4.000
R102 R103 R104 R105	RES,C,1/8W,5%, 20K	BB2035	A-B	4705-05-2002	4.000
R109 R110	RES,C,1/4W,5%,1.5K	CF1/4-1.5K	ASE	4700-15-1501	2.000
R111 R112	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	2.000
R113 R114 R115 R116 R117 R118 R120 R121	RES,C,1/8W,5%,39-OHM	BB3905	A-B	4705-05-3909	8.000
R119	RES,C,1/8W,5%,120	BB1215	A-B	4705-05-1200	1.000
R122	RES,C,1/8W,5%,22	BB2205	A-B	4705-05-2209	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C201 C202 C203 C204 C206 C207 C208 C209	CAP.,CHIP,.1 MF	51C1209-B104Z	CFI	1510-00-3104	8.000
C205	CAP,CHIP,1000PF,50V CC101-210	5BN050S102KS	VAR	1510-00-1102	1.000
C210	CAP,DISC,1KV,10PF	10TCC-Q10	SPR	1510-10-0100	1.000
C211	CAP,VAR,3.5-13PF	7S-TRIKO-02-3.5-13PF	STR	1510-70-0130	1.000
L201	TOROID,10T,1-1/2L	LA009-010-2	W-I	1810-05-0005	1.000
L202 L203 L204	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	3.000
Q201 Q202 Q203 Q204	TRANS QB000-035	BFR90	APX	4902-00-0900	4.000
R201 R206 R207 R208	RES,C,1/8W,5%,240	BB-2415	*****	4705-05-2400	4.000
R202 R203 R204 R205	RES,C,1/8W,5%, 20K	BB2035	A-B	4705-05-2002	4.000
R209 R210	RES,C,1/4W,5%,1.5K	CF1/4-1.5K	ASE	4700-15-1501	2.000
R211 R212	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	2.000
R213 R214 R215 R216 R217 R218 R220 R221	RES,C,1/8W,5%,39-OHM	BB3905	A-B	4705-05-3909	8.000
R219	RES,C,1/8W,5%,120	BB1215	A-B	4705-05-1200	1.000
R222	RES,1/8W,5%,10-OHM	BB1005	A-B	4705-05-1009	1.000

WAVETEK PARTS LIST	AMP BOARD 2, M117	1218-00-0421 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
3	PC ASSEMBLY, M118	M118-PC	W-I	1218-00-0500	1.000

WAVETEK PARTS LIST	DIFF BIAS DET,M118-1	1114-00-9003 PAGE: 1	B REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	FRAME,M118 FROM:1410-30-0700	1414-30-1012	W-I	1414-30-1012	1.000
2	BASE,M118 FROM:3210-08-0033	1414-30-1011	W-I	1414-30-1011	1.000
4	INDEX STUD	A001-009	W-I	1410-00-2680	1.000
5	SCW,SBH,6-32X3/16	6-32X3/16,BH,NP	S-S	2810-17-6103	1.000
6	INT,LOWASHER,6 HW101-600	1304ZP	F-S	2810-24-6000	2.000
7	CONN JF000-004	27-21	APL	2110-03-0001	2.000
8	SWITCH,SPDTST000-003	MST-105D	ALC	5106-00-0002	1.000
11	CAP,FT,500V,470PF	FA5C-4712	A-B	1510-30-0471	3.000
12	CAP,FT,500V,6.8PF	54-794-010-6892	SPEC	1510-30-1689	3.000

WAVETEK PARTS LIST	MODULE ASSY,M118	1216-40-0025 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
9	IC SKT,16 PIN MC000-074	DILB-16P-108	BURND	2112-00-0012	1.000
10	IC SKT,8 PIN	DILB-8P-108	BURND	2112-00-0007	4.000
C01	CAP,VAR,2.5-5PF	5S-TRIKO-04-2.5/5	STR	1510-70-8509	1.000
C02 C03	CAP,DISC,1KV,470PF	60U471M	MDC	1510-10-1471	2.000
C04 C05 C06 C07 C36	CAP,DISC,1KV,68PF	68U2J680J	MDC	1510-10-3680	5.000
C08 C09 C10 C13 C22 C23 C24 C25 C26 C27 C28 C29 C37 C38	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	14.000
C11 C39	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	2.000
C12	CAP,FILM,250V,.047UF	818347254	REI	1510-60-9473	1.000
C14 C15 C16 C17 C18 C19 C20 C21	CAP,MICA,500V,.001UF	DM15-102J	ARC	1510-50-0102	8.000
CR01 CR02 CR03 CR04	DIODE,SCHOTTKY	5082-2835	H-P	4809-02-0002	4.000
IC01 IC02 IC03 IC04	DUAL OP AMP,RAY ONLY	RC4558NB-RAY	RAY	7000-45-5801	4.000
IC05	QUAD ANALOG SWITCH STATIC SENSITIVE	HI-201-5	HSD	8000-02-0100	1.000
L01	RF CHOKE,REF ONLY	CHOKE	W-I	1819-99-9999	1.000
L02	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	1.000
L03	TOROID,10T,1-1/2L	LA009-010-2	W-I	1810-05-0005	1.000
Q01 Q02	TRANS QA039-040	2N3904	NAT	4901-03-9040	2.000
Q03	TRANS QA054-580	2N5458	MOT	4901-05-4580	1.000
R01 R02	RES,C,1/4W,5%,75	CR1/4-75	ASE	4700-15-7509	2.000
R03 R04 R05 R25	RES,C,1/4W,5%,220	CF1/4-220	ASE	4700-15-2200	4.000
R06 R07	RES,C,1/4W,5%,270K	CF1/4-270K	ASE	4700-15-2703	2.000
R08 R09 R17 R18 R22	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	5.000
R10	RES,C,1/8W,5%,6.8K	CF1/8-6.8K	ASE	4700-05-6801	1.000
R11 R12	RES,C,1/4W,5%,470K	CF1/4-470K	ASE	4700-15-4703	2.000
R13 R14	RES,C,1/8W,5%,20K	CF1/8-20K	ASE	4700-05-2002	2.000
R15 R16	RES,C,1/4W,5%,5.6K	CF1/4-5.6K	ASE	4700-15-5601	2.000
R19 R20 R21 R24 R28	RES,C,1/8W,5%,10K	CF1/8-10K	ASE	4700-05-1002	5.000
R23 R39	POT,10K,RP130-310	89PR10K	BEK	4610-00-2103	2.000
R26 R27 R30 R56 R57 R58 R59 R60 R61 R62 R63	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	11.000
R29	RES,C,1/8W,5%,56K	CF-1/8-56K	ASE	4700-05-5602	1.000

WAVETEK PARTS LIST	PC ASSEMBLY, M118	1218-00-0500 PAGE: 1	F REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R31	RES,C,1/8W,5%,10	CF1/8-10	ASE	4700-05-1009	1.000
R32	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	1.000
R33 R48 R55	RES,MF,1/8W,1%,3.01K	RN55D-3.01K	MILSP	4701-03-3011	3.000
R34 R36 R37	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	3.000
R35	RES,C,1/4W,5%,3K	CF1/4-3K	ASE	4700-15-3001	1.000
R38	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	1.000
R40	RES,C,1/4W,5%,1.2K	CF1/4-1.2K	ASE	4700-15-1201	1.000
R41 R42 R43 R46 R47	RES,C,1/4W,5%,6.2K	CF1/4-6.2K	ASE	4700-15-6201	5.000
R44 R45	RES,MF,1/8W,1%,7.5K	RN55D-7.5K	MILSP	4701-03-7501	2.000
R49	RES,MF,1/8W,1%,4.32K	RN55D-4.32K	MILSP	4701-03-4321	1.000
R50	RES,MF,1/8W,1%,1.58K	RN55D-1.58K	MILSP	4701-03-1581	1.000
R51	RES,MF,1/8W,1%,2.15K	RN55D-2.15K	MILSP	4701-03-2151	1.000
R52	RES,MF,1/8W,1%,1.43K	RN55D-1.43K	MILSP	4701-03-1431	1.000
R53	RES,MF,1/8W,1%,1.82K	RN55D-1.82K	MILSP	4701-03-1821	1.000
R54	RES,MF,1/8W,1%,768	RN55D-768	MILSP	4701-03-7680	1.000
R64	RES,C,1/8W,5%,56	CF1/8-56	ASE	4700-05-5609	1.000
T01	RF XFMR FROM:1813-00-0008	1210-41-0006	W-I	1210-41-0006	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
2	INDEX STUD	A001-009	W-I	1410-00-2680	1.000
3	NUT,6-32X1/4HN101-600	8005NP	F-S	2810-14-6100	1.000
4	INT,LOWASHER,6 HW101-600	1304ZP	F-S	2810-24-6000	1.000
C01 C02	CAP,FT,500V,6,8PF	54-794-010-6892	SPEC	1510-30-1689	2.000

WAVETEK PARTS LIST	DUMMY BASE, FOR M119	1118-00-0048 PAGE: 1	C REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
21	CRT FACEPLACE, 1865	1410-30-1700	W-I	1410-30-1700	1.000
R75	250K POT	WA2G028S254UA	A-B	4610-14-4254	1.000

WAVETEK PARTS LIST	FRONT PANEL ASY,1865	1118-40-0043 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
MNONE	SUN SHIELD R SIDE	1410-30-1650	W-I	1410-30-1650	1.000

WAVETEK PARTS LIST	SUN SHEILD ASSY,1865	1216-00-0013 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
6	REAR ACCESS PNL B/P	1410-60-1290	W-I	1410-60-1290	1.000
12	REAR ACCES. PANEL GASKET PER B/P	1410-30-1600	W-I	1410-30-1600	1.000
19	CUSHION REAR RECPT.	1410-01-0590	W-I	1410-01-0590	1.000
20	COV ASSY,1865 RECEPT	1216-00-0003	W-I	1216-00-0003	1.000

WAVETEK PARTS LIST	65 REAR PANEL ASSY	1216-40-0011 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
3	BELT BAR RETNR. PER B/P	1410-01-0510	W-I	1410-01-0510	4.000
4	STRIP,STRAP RET,1865	1216-00-0008	W-I	1216-00-0008	4.000
7	STRIP,FRONT NUT TOP/BOT PER B/P	1410-01-0930	W-I	1410-01-0930	2.000
8	FRONT SIDE NUT STRIP PER B/P	1410-01-0500	W-I	1410-01-0500	2.000
9	STRIP, BACK NUT TOP/BOT PER B/P	1410-01-0940	W-I	1410-01-0940	2.000
10	STRIP-BCK.SIDE NUT PER B/P	1410-01-0530	W-I	1410-01-0530	2.000
11	FRONT PANEL GASKET PER B/P	1410-30-1610	W-I	1410-30-1610	1.000
15	PLATE,VELCR MTG,1865	1216-00-0007	W-I	1216-00-0007	2.000
16	WASHER,10,1/2 IN O.D	1411-NP	F-S	2810-26-0014	4.000
23	SCREW,10-32X1/2,FH PHILLIPS,BLACK	18286-BLK.OX.	F-S	2810-23-0028	8.000
24	NUT,HEX,#10-32,NP	8011-NP	F-S	2810-16-0015	8.000
25	LOCKWASHER,10,SPRING	1362-NP	F-S	2810-28-0033	10.000
27	VELWASHER PER B/P	1410-01-0640	W-I	1410-01-0640	1.000
28	WASHER,FLAT,4	1403ZP	F-S	2810-26-4000	2.000
29	HARN ASSY,CASE,1865	1216-00-0004	W-I	1216-00-0004	1.000
31	STRAP ASSY,STRG,1865	1216-00-0006	W-I	1216-00-0006	1.000
35	POP RIVET,1/8 DIA	5X521	DAYTN	2810-30-0010	18.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
2	HOUSING CVR. PER B/P	1410-80-0560	W-I	1410-80-0560	1.000
13	CLAMP,BELT END	1410-01-0960	W-I	1410-01-0960	5.000
14	BACK UP PLT.PER B/P	1410-01-0570	W-I	1410-01-0570	5.000
17	HANDLE,HSNG COV,1865	1216-00-0005	W-I	1216-00-0005	1.000
18	HINGE BELT PER B/P REF:3210-99-0032	1410-01-0610	W-I	1410-01-0610	2.000
22	SCREW,10-32X5/8,PAN, PHILLIPS,NP STEEL	19087-NP	F-S	2810-23-0029	32.000
24	NUT,HEX,#10-32,NP	8011-NP	F-S	2810-16-0015	6.000
25	LOCKWASHER,10,SPRING	1362-NP	F-S	2810-28-0033	6.000
26	COVER GASKET PER B/P	1410-01-0480	W-I	1410-01-0480	1.000
28	WASHER,FLAT,4	1403ZP	F-S	2810-26-4000	2.000
30	BUMPER CONTROL PNL. SW. PER B/P	1410-01-0620	W-I	1410-01-0620	4.000
32	BELT END STRIPPER B/P	1410-01-0490	W-I	1410-01-0490	5.000
33	VELCRO SHLD HOLDER REF3210-99-0030	1410-01-0650	W-I	1410-01-0650	1.000
35	POP RIVET,1/8 DIA	5X521	DAYTN	2810-30-0010	2.000

WAVETEK PARTS LIST	65 COVER-HSG SUB ASY	1216-40-0019 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	SOCKETMC000-002	016-2604-00-0-209	SEL	2112-00-0002	27.000
2	GROUND LUG,#6,INT HG102-600	38-111	F-S	2112-03-0003	1.000
3	MAIN UNIT CHAS B/P	1410-80-0430	W-I	1410-80-0430	1.000

WAVETEK PARTS LIST	CHASSIS ASSY,1865	1216-40-0030 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
S05	SWITCH,TOGGLE ST003-006	7201P3NYZQ	C-K	5106-00-0012	1.000

WAVETEK PARTS LIST	CARD CG/MTHR BD ASSY	1216-40-0032 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	TERM,MINI-PVMC000-092	47217	BER	2113-20-0001	10.000

WAVETEK PARTS LIST	MODULE HARNESS, 1865	1219-00-0164 PAGE: 1	B REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	TERM,MINI-PVMC000-092	47217	BER	2113-20-0001	14.000
2	CONTACT MC000-068	08-50-0107	MOL	2113-07-0001	7.000

WAVETEK PARTS LIST	ATTENUATOR/KEYBOARD HARNESS 1865	1219-00-0165 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	TERM,MINI-PVMC000-092	47217	BER	2113-20-0001	9.000

WAVETEK PARTS LIST	OPTION HARNESS, 1865	1219-00-0166 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	ATTEN 7510-05	7510-05	W-I	1113-20-0046	1.000
2	ATTEN 7550-04	1113-20-0047	W-I	1113-20-0047	1.000
3	ATTENUATOR/KEYBOARD HARNESS 1865	WY1865-ATT/KEYBD	W-I	1219-00-0165	1.000

WAVETEK PARTS LIST	ATTEN ASSY, 1865	1219-00-0168 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C47	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	1.000
Q07	TRANS QB000-023	MJE242	MOT	4902-00-2420	1.000
Q13	POWER,FET SCX VN46AF SCX, STATIC SENS.	VN46AF	SCX	4902-00-0460	1.000
R01 R31	RES,C,1/4W,5%,330	CF1/4-330	ASE	4700-15-3300	2.000
R21	RES,C,1/4W,5%,1M	CF1/4-1M	ASE	4700-15-1004	1.000
R41	RES,C,1/2W,5%,27	EB2705	A-B	4700-25-2709	1.000
R74	RES,C,1/4W,5%,330K	CF1/4-330K	ASE	4700-15-3303	1.000

WAVETEK PARTS LIST	CRT ASSEMBLY, 1865	1219-00-0172 PAGE: 1	D REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	MODIFIED CAN PER B/P FROM:3210-08-0003	1410-01-1420	W-I	1410-01-1420	1.000
2	FISH PAPER PER B/P	1410-01-1410	W-I	1410-01-1410	1.000
3	PC BD, Z1006 FROM:3210-05-004	Z1006	W-I	1710-00-3440	1.000
4	STRAIN REL. BUSHING HB104-002	SR-5P-4 BLK	HEY	2810-37-0001	2.000
8	COVER	HU6729CA-HT	HUD	3210-08-0004	1.000
11	DECAL,MODEL NO, BC-2	MDB-26	W-I	2410-04-0419	1.000
C01	CAP,ELEC,25V,100UF	TE1211	SPR	1510-20-4101	1.000
CR01	DIODE,RECT,200V	1N5624	G-E	4806-01-5624	1.000
P01	PLUG,ACCESSORY 6-12V	20/2 SPT-1 W/#6 PLUG	AMELC	2112-32-0002	1.000
R01	RES,WW,5W,5%,.1	45JR10	OHM	4702-65-1007	1.000

WAVETEK PARTS LIST	BATT INTFC,BC2-1865	1019-00-0194 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
6	TERM,FEMALE	350388-1	AMP	2113-30-0001	2.000
10	HEATER CORD,2 COND, 18 GA.	19328	BEL	6014-51-8000	42.000
J02	CONN,FEM,PER B/P FROM:2113-29-0001	2113-29-0003	W-I	2113-29-0003	1.000

WAVETEK PARTS LIST	BC-2 HEATER CORD SET	1219-40-0089 PAGE: 1	REV

SECTION 7

OPTIONAL EQUIPMENT PARTS LIST

		PAGE
PLT CAR NOTCH, M113	1114-00-0154	103
OPT B-7,BATT BACK UP	1019-00-0072	104
BATT BACK-UP,M152	1114-00-9001	
PC ASSY, M152	1218-00-9002	105
OPT DP-5, DUAL PILOT	1019-00-0187	
PSK MODULATOR, M135-5	1114-00-0354	106
CABLE ASSY,3 ½ IN	1217-70-0061	
PC ASSY,M135-5	1218-00-0473	107-108
SWITCH PC ASSY,M135-155	1218-00-1341	109
OPT DP-155,DUAL PILOT	1019-00-0189	
PSK MODULATOR,M135-155	1114-00-0357	
PC ASSY, M135-155	1218-00-0471	110-112
CABLE ASSY,3 ½ IN	1217-70-0061	113
SWITCH PC ASSY,M135-155	1218-00-1341	
OPT DP-5, DUAL PILOT	1019-00-0190	
PSK DEMODULATOR,M119-5	1114-00-0350	114
MODULE ASSY,M119-DP	1216-40-0024	115
CABLE ASSY,3 ½ IN	1217-70-0061	
AMP BD,M119-5	1218-00-0433	116
OSC BD,M119-5	1218-00-0443	117
PHASE LK BD,M119-5	1218-00-0453	118-119
OPT DP-155,DUAL PILOT	1019-00-0192	120
PDK DEMODULATOR,M119-155	1114-00-0353	121
AMP ASSY,M119-155	1218-00-0431	122
OSC ASSY,M119-155	1218-00-0441	123
PHASE LOCK BD,M119	1218-00-0450	124-125
SWITCH PC ASSY,M119-155	1218-00-1340	126
K022,CD RDR ,PD KIT	1019-00-9001	127
PC ASSY,CD RDR OPT	1110-00-9001	128
OPT/INTFC BD	1110-00-9002	129
CASE/CHAS INTFC BD	1110-00-9003	

SECTION 7

OPTIONAL EQUIPMENT PARTS LIST

		PAGE
NUT PLATE ASSY	1111-00-9001	129
CS/CHAS INFC HARNESS	1219-40-0085	130
CHA/OPT BD,INFC HARN	1219-40-0086	
CARD READER ASSY	1118-00-9001	131
CHASSIS, CD RDR	1216-00-9001	132
MTG PLATE ASSY	1216-00-9002	133
CONN ASSY	1216-00-9003	134
PC ASSY,CD RDR	1218-00-9001	135-136
HARNESS,CRW-1	1219-00-9001	137
OPT ME-1	1019-40-9012	138
ME-1 PC ASSY	1110-40-9010	139-140
HARNESS,BATT BACKUP	1219-40-9009	141
AC PWR SUPPLY,BC	1019-00-0177	142
HARNESS,BC-3-A	1219-00-0324	143
HARNESS,BC-3-C	1219-00-0326	144

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	IC SKT,PC,14 PIN MC000-073	C931402	T-I	2112-00-0011	1.000
C01 C03	CAP,FT,500V,6.8PF	54-794-010-6892	SPEC	1510-30-1689	2.000
C02	CAP,DISC,1KV,15PF	10TCC-Q15	SPR	1510-10-0150	1.000
C04	CAP,FT,500V,1000PF	54-794-010-102P	SPEC	1510-30-8102	1.000
CR01 CR02	DIODE,SIGNAL	1N914	G-E	4807-01-0914	2.000
IC01	IC,IL004-001	LM339N	NAT	7000-03-3900	1.000
Q01 Q02	TRANS QA039-040	2N3904	NAT	4901-03-9040	2.000
Q03	TRANS QB000-009	MPS3702	NAT	4902-03-7020	1.000
R01 R02 R10 R11	RES,C,1/4W,5%,47K	CF1/4-47K	ASE	4700-15-4702	4.000
R03 R12	RES,C,1/4W,5%,22K	CF1/422K	ASE	4700-15-2202	2.000
R04 R13	POT,20K,RP130-320	89PR20K	BEK	4610-00-2203	2.000
R05	RES,MF,1/8W,1%,9.09K	RN55D-9.09K	MILSP	4701-03-9091	1.000
R06	RES,MF,1/8W,1%,33.2	RN55D-33.2	MILSP	4701-03-3329	1.000
R07	RES,MF,1/8W,1%,154	RN55D-154	MILSP	4701-03-1540	1.000
R08	POT,2K,RP130-220	89PR2K	BEK	4610-00-2202	1.000
R09	RES,MF,1/8W,1%,8.25K	RN55D-8.25K	MILSP	4701-03-8251	1.000
R14 R16	RES,C,1/4W,5%,56K	CF1/4-56K	ASE	4700-15-5602	2.000
R15 R17	RES,C,1/4W,5%,33K	CF1/4-33K	ASE	4700-15-3302	2.000
R18	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	1.000
R19	RES,C,1/4W,5%,150	CF1/4-150	ASE	4700-15-1500	1.000
R20	RES,C,1/4W,5%,1.5M	CF1/4-1.5M	ASE	4700-15-1504	1.000

WAVETEK PARTS LIST	PLT CAR NOTCH,M113	1114-00-0154 PAGE: 1	E REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
ZA1	BATT BACK-UP, M152	M152	W-I	1114-00-9001	1.000

WAVETEK PARTS LIST	OPT B-7,BATT BACK-UP	1019-00-0072 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C03 C04 C05	CAP,FT,500V,1000PF	54-794-010-102P	SPEC	1510-30-8102	3.000
ZA1	PC ASSY, M152	M152-PC	W-I	1218-00-9002	1.000

WAVETEK PARTS LIST	BATT BACK-UP, M152	1114-00-9001 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	PC BOARD, Z1007	Z1007	W-I	1710-00-3610	1.000
2	CABLE TIE,4	PLTIM-MP	PAND	2810-00-0010	1.000
BT1	BATT,AA,NICD,1.2 V	K01A111AA-GTI	GE	4010-00-0006	1.000
C01	CAP,ELEC,12V,100UF	ME4D100	ARC	1510-21-2101	1.000
C02	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	1.000
CR01 CR03	DIODE,SIGNAL	1N914	G-E	4807-01-0914	2.000
CR02	DIODE,RECT,400V	1N4004	P-C	4806-01-4004	1.000
Q01 Q03	TRANS QA039-060	2N3906	T-I	4901-03-9060	2.000
Q02 Q04	TRANS QA039-040	2N3904	NAT	4901-03-9040	2.000
R01 R03	RES,C,1/4W,5%,1.5K	CF1/4-1.5K	ASE	4700-15-1501	2.000
R02	POT,1K	91AR1K	BEK	4610-00-7102	1.000
R04	RES,C,1/4W,5%,22	CF1/4-22	ASE	4700-15-2209	1.000
R05	RES,C,1/4W,5% 1.3K	CF1/4-1.3K	ASE	4700-15-1301	1.000
R06	RES,C,1/4W,5%,3.9K	CF1/43.9K	ASE	4700-15-3901	1.000
R07	RES,C,1/4W,5%M91	CF1/4-91	ASE	4700-15-9109	1.000
R08	RES,C,1/4W,5%,15K	CF1/4-15K	ASE	4700-15-1502	1.000
VR01	IC,2.5VOLT REF	LM336Z	NAT	7000-03-3600	1.000

WAVETEK PARTS LIST	PC ASSY, M152	1218-00-9002 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	PSK MODULATORM135-5	M135-5	W-I	1114-00-0354	1.000
W06	CABLE ASSY, 3 1/2 IN	WX1865-W4	W-I	1217-70-0061	1.000

WAVETEK PARTS LIST	OPT DP-5, DUAL PILOT	1019-00-0187 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	SWITCH PC ASSY M135-155	M135-155-SW BD	W-I	1218-00-1341	1.000
2	PC ASSY, M135-5	M135-5-PC	W-I	1218-00-0473	1.000
10	INT,LOWASHER,6 HW101-600	1304ZP	F-S	2810-24-6000	1.000
C01 C02 C06 C15	CAP,FT,500V,1000PF	54-794-010-102P	SPEC	1510-30-8102	4.000
C05	CAP,FT,500V,6.8PF	54-794-010-6892	SPEC	1510-30-1689	1.000
CR09 CR10	DIODE,RECT,400V	1N4004	P-C	4806-01-4004	2.000
J01 J02	CONN JF000-004	27-21	APL	2110-03-0001	2.000
J03 J04	PV JUMPER	65474-002	BER	2112-10-0002	2.000
L01 L02	TOROID,10T	LA009-010	W-I	1810-05-0002	2.000
MX01	MIXER,DBL.BALANCED	CM-1	VARIL	3010-54-0001	1.000
X1	CRYSTAL, 5.00000MHZ	X32W-5.00000	W-I	2310-00-0911	1.000

WAVETEK PARTS LIST	PSK MODULATOR M135-5	1114-00-0354 PAGE: 1	C REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CONN JF000-008	27-25	APL	2110-03-1004	2.000

WAVETEK PARTS LIST	CABLE ASSY, 3 1/2 IN	1217-70-0061 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C03 C04 C17 C18	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	4.000
C07 C08	CAP,DISC,1KV,10PF	10TCC-Q10	SPR	1510-10-0100	2.000
C09 C10 C24 C25	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	4.000
C11 C28 C29	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	3.000
C12	CAP,MICA,500V,160PF	DM15-161J	ARC	1510-50-0161	1.000
C13 C19 C20 C26	CAP,DISC,1KV,470PF	60U471M	MDC	1510-10-1471	4.000
C14	CAP,DISC,1KV,1200PF	5GA-D12	SPR	1510-10-1122	1.000
C16	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	1.000
C21	CAP,MICA,500V,330PF	DM15-331J	ARC	1510-50-0331	1.000
C22	CAP,MICA,300V,47PF	ADM-5-470J	ARC	1510-50-1470	1.000
C23	CAP,MICA,500V,470PF	DM15-471J	ARC	1510-50-0471	1.000
C27	CAP,MICA,500V,100PF	DM15-101J	C-D	1510-50-0101	1.000
CR01 CR07	DIODE,SIGNAL	1N914	G-E	4807-01-0914	2.000
CR02 CR03	DIODE,SCHOTTKY	5082-2835	H-P	4809-02-0002	2.000
CR04 CR05 CR06	DIODE,PIN	MA47047	M-A	4805-02-0003	3.000
CR08	DIODE,RECT,400V	1N4004	P-C	4806-01-4004	1.000
IC01	OP AMP	N5741CV	SIG	7000-57-4100	1.000
J02 J03	PV JUMPER	65474-002	BER	2112-10-0002	2.000
L03 L06	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
L04	CHOKE,COATED,4.7UH	08N4R7	JEF	1810-03-0479	1.000
L05 L09	CHOKE,COATED,1UH	08N1R0	JEF	1810-03-0010	2.000
L07 L13	CHOKE,COATED,2.2UH	08N2R2	JEF	1810-03-0229	2.000
L08	CHOKE,COATED,1.2UH	08N1R2	JEF	1810-03-0129	1.000
L10	CHOKE,COATED,2.7UH	08N2R7	JEF	1810-03-0279	1.000
L11	CHOKE,COATED,.82UH	08NR82	JEF	1810-03-0828	1.000
L12	CHOKE,MOLDED,510UH	2500-14	DEL	1810-01-5100	1.000
P02 P03	HEADER,STRT,2 PIN REF:2112-07-0000	65501-402	BER	2112-07-0007	2.000
Q01 Q03	TRANS QA039-040	2N3904	NAT	4901-03-9040	2.000
Q02 Q04	TRANS QA039-050	2N3905	NAT	4901-03-9050	2.000
Q05 Q06	TRANS QA050-530	2N5053	APX	4901-05-0530	2.000
R01	RES,C,1/4W,5%,1.5K	CF1/4-1.5K	ASE	4700-15-1501	1.000
R02 R11 R34 R44	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	4.000

WAVETEK PARTS LIST	PC ASSY, M135-5	1218-00-0473 PAGE: 1	B REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R03 R05	RES,C,1/4W,5%,27K	CF1/4-27K	ASE	4700-15-2702	2.000
R04	RES,C,1/4W,5%,3K	CF1/4-3K	ASE	4700-15-3001	1.000
R06 R17	RES,C,1/4W,5%,15K	CF1/4-15K	ASE	4700-15-1502	2.000
R07	RES,C,1/4W,5%,430K	CF1/4-430K	ASE	4700-15-4303	1.000
R08	RES,C,1/4W,5%,82	CF1/4-82	ASE	4700-15-8209	1.000
R09 R13 R37 R45 R46	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	5.000
R10 R12 R14	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	3.000
R15 R32	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	2.000
R16 R28	RES,C,1/4W,5%,9.1K	CF1/4-9.1K	ASE	4700-15-9101	2.000
R18 R35 R48	RES,C,1/4W,5%,6.8K	CF1/4-6.8K	ASE	4700-15-6801	3.000
R19 R29	POT,10K,RP130-310	89PR10K	BEK	4610-00-2103	2.000
R20	RES,C,1/4W,5%,39K	CF1/4-39K	ASE	4700-15-3902	1.000
R21 R36 R51	RES,C,1/4W,5%,470	CF1/4-470	ASE	4700-15-4700	3.000
R22	RES,C,1/8W,5%,33	CF-1/8-33	ASE	4700-05-3309	1.000
R23 R25 R41 R42	RES,C,1/4W,5%,200	CF1/4-200	ASE	4700-15-2000	4.000
R24	RES,C,1/4W,5%,62	CF1/4-62	ASE	4700-15-6209	1.000
R26 R27	RES,C,1/8W,5%,150	CF1/8-150	ASE	4700-05-1500	2.000
R30	RES,C,1/4W,5%,20K	CF1/4-20K	ASE	4700-15-2002	1.000
R31	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	1.000
R33 R47	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	2.000
R38	RES,C,1/4W,5%,2.2K	CF1/4-2.2K	ASE	4700-15-2201	1.000
R39 R40 R52	RES,C,1/4,5%,27	CF1/4-27	ASE	4700-15-2709	3.000
R43	RES,C,1/4W,5%,330	CF1/4-330	ASE	4700-15-3300	1.000
R49	RES,C,1/4W,5%,390	CF1/4-390	ASE	4700-15-3900	1.000
R50	RES,C,1/4W,5%,68	CF1/4-68	ASE	4700-15-6809	1.000
R53	RES,C,1/8W,5%,27	BB 2705	A-B	4705-05-2709	1.000
R57 R58	RES,C,1/8W,5%,430	BB4315	A-B	4705-05-4300	2.000
T01 T02	RF XFMR FROM:1813-00-0008	1210-41-0007	W-I	1210-41-0007	2.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C401 C402 C403 C404 C405 C406 C407	CAP.,CHIP,.1 MF	51C1209-B104Z	CFI	1510-00-3104	7.000
CR401 CR402 CR403 CR404	DIODE DG000-014	BA182	APX	4812-02-0003	4.000
R401 R405	RES,C,1/8W,5%,1K RC101-210	CF1/8-1K	ASE	4700-05-1001	2.000
R402 R403 R404	RES,C,1/8W,5%,2K	CF1/8-2K	ASE	4700-05-2001	3.000

WAVETEK PARTS LIST	SWITCH PC ASSY M135-155	1218-00-1341 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	PSK MODULATORM135-155	M135-155	W-I	1114-00-0357	1.000
W06	CABLE ASSY, 3 1/2 IN	WX1865-W4	W-I	1217-70-0061	1.000

WAVETEK PARTS LIST	OPT DP-155, DUAL PILOT, 1855	1019-00-0189 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C01 C02 C06 C15	CAP,FT,500V,1000PF	54-794-010-102P	SPEC	1510-30-8102	4.000
C05	CAP,FT,500V,6.8PF	54-794-010-6892	SPEC	1510-30-1689	1.000
CR09 CR10	DIODE,RECT,400V	1N4004	P-C	4806-01-4004	2.000
J01 J03	CONN JF000-004	27-21	APL	2110-03-0001	2.000
L01 L02	TOROID,10T	LA009-010	W-I	1810-05-0002	2.000
MX1	MIXER,DBL.BALANCED	CM-1	VARIL	3010-54-0001	1.000
X1	CRYSTAL,51.66666 MHZ	X33W-51.66666	W-I	2310-00-0871	1.000

WAVETEK PARTS LIST	PSK MODULATOR M135-155	1114-00-0357 PAGE: 1	E REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C03 C04 C17 C18	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	4.000
C07 C08	CAP,DISC,1KV,10PF	10TCC-Q10	SPR	1510-10-0100	2.000
C09	CAP,MICA,300V,150PF	DM15-151J	ARC	1510-50-1151	1.000
C10 C27 C28 C29 C30	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	5.000
C11	CAP,MICA,300V,20PF	ADM-5-200J	ARC	1510-50-1200	1.000
C12	CAP,MICA,500V,120PF	DM15-121J	ARC	1510-50-0121	1.000
C13	CAP,MICA,300V,15PF	DM-5CC150J	ARC	1510-50-1150	1.000
C14	CAP,MICA,300V,27PF	DM15-270J	ARC	1510-50-1270	1.000
C16	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	1.000
C19 C20	CAP,DISC,1KV,470PF	60U471M	MDC	1510-10-1471	2.000
C21	CAP,MICA,300V,8PF	DM-5CC080D	ARC	1510-50-1809	1.000
C22	CAP,COMP,500V,.75PF	MC-.75PF	Q-C	1510-40-1758	1.000
C23	CAP,MICA,300V,12PF	DM-5CC120J	ARC	1510-50-1120	1.000
C24 C25	CAP,DISC,1KV,.01UF	5GA-S10	SPR	1510-10-1103	2.000
C26	CAP,COMP,500V,.62PF	MC-.62PF	Q-C	1510-40-1628	1.000
C31	CAP,COMP,500V,2PF	QC-2.0PF	Q-C	1510-40-0020	1.000
C32	CAP,MICA,300V,24PF	ADM-5-240J	ARC	1510-50-1240	1.000
CR01 CR07	DIODE,SIGNAL	1N914	G-E	4807-01-0914	2.000
CR02 CR03	DIODE,SCHOTTKY	5082-2835	H-P	4809-02-0002	2.000
CR04 CR05 CR06	DIODE,PIN	MA47047	M-A	4805-02-0003	3.000
CR08	DIODE,RECT,400V	1N4004	P-C	4806-01-4004	1.000
IC01	OP AMP	N5741CV	SIG	7000-57-4100	1.000
J02	PV JUMPER	65474-002	BER	2112-10-0002	1.000
L03	COIL,15T,.2ID,AIR	1815-00-0032	W-I	1815-00-0032	1.000
L04	CHOKE,COATED,2.2UH	08N2R2	JEF	1810-03-0229	1.000
L05 L06	TOROID,10T	LA009-010	W-I	1810-05-0002	2.000
L07 L10	COIL,4-1/2T,#22 .200 ID,1/4 LEADS	1815-00-0017	W-I	1815-00-0017	2.000
L08 L11	COIL,AIR,2T,0.200 ID	2T,PER SPEC.	ATR	1815-00-0001	2.000
L09	COIL,AIR,3T,.200 ID	3T,PER SPEC.	ATR	1815-00-0002	1.000
L12	RF XFMR FROM:1813-00-0007	1810-06-0001	W-I	1810-06-0001	1.000
L13	COIL,AIR,4T,.200 ID	4T,PER SPEC.	ATR	1815-00-0003	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
P02	HEADER,STRT,2 PIN REF:2112-07-0000	65501-402	BER	2112-07-0007	1.000
Q01 Q03	TRANS QA039-040	2N3904	NAT	4901-03-9040	2.000
Q02 Q04	TRANS QA039-050	2N3905	NAT	4901-03-9050	2.000
Q05	TRANSISTOR,NPN, MOT ONLY	2N5179-MOT	MOT	4901-05-1791	1.000
Q06	TRANS QA050-530	2N5053	APX	4901-05-0530	1.000
Q07	TRANS QA038-541 2N3854A	2N3854A	G-E	4901-03-8541	1.000
R01	RES,C,1/8W,5%,1.5K	CF 1/8-1.5K	ASE	4700-05-1501	1.000
R02 R18 R55 R56	RES,C,1/8W,5%,1K RC101-210	CF1/8-1K	ASE	4700-05-1001	4.000
R03 R05 R54	RES,C,1/8W,5%,27K	CF 1/8-27K	ASE	4700-05-2702	3.000
R04	RES,C,1/4W,5%,3K	CF1/4-3K	ASE	4700-15-3001	1.000
R06	RES,C,1/4W,5%,15K	CF1/4-15K	ASE	4700-15-1502	1.000
R07	RES,C,1/4W,5%,430K	CF1/4-430K	ASE	4700-15-4303	1.000
R08	RES,C,1/4W,5%,82	CF1/4-82	ASE	4700-15-8209	1.000
R09 R13 R40 R46	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	4.000
R10 R12 R14	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	3.000
R11 R34 R44	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	3.000
R15	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	1.000
R16 R31	RES,C,1/8W,5%,10K	CF1/8-10K	ASE	4700-05-1002	2.000
R17	RES,C,1/8W,5%,15K	CF 1/8-15K	ASE	4700-05-1502	1.000
R19 R29	POT,10K,RP130-310	89PR10K	BEK	4610-00-2103	2.000
R20	RES,C,1/8W,5%,39K	CF 1/8-39K	ASE	4700-05-3902	1.000
R23 R25	RES,C,1/8W,5%,240	CF1/8-240	ASE	4700-05-2400	2.000
R24	RES,C,1/8W,5%,51	CF1/8-51	ASE	4700-05-5109	1.000
R26 R27	RES,C,1/8W,5%,150	CF1/8-150	ASE	4700-05-1500	2.000
R28	RES,C,1/8W,5%,27	BB 2705	A-B	4705-05-2709	1.000
R30	RES,C,1/8W,5%,20K	CF1/8-20K	ASE	4700-05-2002	1.000
R32	RES,C,1/8W,5%,100 RC101-110	CF1/8-100	ASE	4700-05-1000	1.000
R33	RES,C,1/8W,5%,100K	CF1/8-100K	ASE	4700-05-1003	1.000
R35	RES,C,1/8W,5%,6.8K	CF1/8-6.8K	ASE	4700-05-6801	1.000
R36	RES.C.1/8W 5% 470	CF1/8-470	ASE	4700-05-4700	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R37 R39 R45	RES,C,1/8W,5%,10	CF1/8-10	ASE	4700-05-1009	3.000
R38	RES,C,1/4W,5%,9.1K	CF1/4-9.1K	ASE	4700-15-9101	1.000
R41	RES,C,1/8W,5%,220	CF1/8-220	ASE	4700-05-2200	1.000
R42	RES,C,1/4W,5%,220	CF1/4-220	ASE	4700-15-2200	1.000
R43	RES,C,1/4W,5%,330	CF1/4-330	ASE	4700-15-3300	1.000
R47	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	1.000
R48	RES,C,1/4W,5%,6.8K	CF1/4-6.8K	ASE	4700-15-6801	1.000
R49	RES,C,1/8W,5%,390	CF1/8-390	ASE	4700-05-3900	1.000
R50	RES,C,1/8W,5%,68	CF1/8-68	ASE	4700-05-6809	1.000
R51	RES,C,1/4W,5%,470	CF1/4-470	ASE	4700-15-4700	1.000
R52	RES,C,1/4,5%,27	CF1/4-27	ASE	4700-15-2709	1.000
R53	RES,C,1/8W,5%,56	CF1/8-56	ASE	4700-05-5609	1.000
R57 R58	RES,C,1/8W,5%,430	BB4315	A-B	4705-05-4300	2.000
T01 T02	RF XFMR FROM:1813-00-0008	1210-41-0007	W-I	1210-41-0007	2.000
T03	RF XFMR FROM:1813-00-0001	1210-42-0029	W-I	1210-42-0029	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CONN JF000-008	27-25	APL	2110-03-1004	2.000

WAVETEK PARTS LIST	CABLE ASSY, 3 1/2 IN	1217-70-0061 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C401 C402 C403 C404 C405 C406 C407	CAP.,CHIP,.1 MF	51C1209-B104Z	CFI	1510-00-3104	7.000
CR401 CR402 CR403 CR404	DIODE DG000-014	BA182	APX	4812-02-0003	4.000
R401 R405	RES,C,1/8W,5%,1K RC101-210	CF1/8-1K	ASE	4700-05-1001	2.000
R402 R403 R404	RES,C,1/8W,5%,2K	CF1/8-2K	ASE	4700-05-2001	3.000

WAVETEK PARTS LIST	SWITCH PC ASSY M135-155	1218-00-1341 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	PSK DEMODULATOR, M119-5	M119-5	W-I	1114-00-0350	1.000
W06	CABLE ASSY, 3 1/2 IN	WX1865-W4	W-I	1217-70-0061	1.000

WAVETEK PARTS LIST	OPT DP-5, DUAL PILOT	1019-00-0190 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
16	SCW,SBH,2-56X3/16	4001NP	F-S	2810-17-2103	15.000
17	LOWASHER,INT 2	1330NP	F-S	2810-24-2000	15.000
20	IC SKT,PC,14 PIN MC000-073	C731402	T-I	2112-00-0011	1.000
23	FISHPAPER;PHASE LOCK PER B/P	A001-963	W-I	1410-00-9440	1.000
24	FISHPAPER; BANDPASS PER B/P	A001-964	W-I	1410-00-9450	1.000
25	OSC FISH PAPER B/P	A001-965	W-I	1410-00-9460	1.000
C01 C02 C03	CAP,FT,500V,2200PF	4420-2200PF	AER	1510-31-1222	3.000
C04 C05	CAP,FT,500V,4.7PF	4420-4.7PF	AER	1510-31-4479	2.000
C13	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	1.000
CR01 CR02	DIODE,RECT,400V	1N4004	P-C	4806-01-4004	2.000
IC01	QUAD NAND STATIC SENSITIVE	MC14011BCP	MOT	8001-40-1112	1.000
L01	TOROID,10T,1-1/2L	LA009-010-2	W-I	1810-05-0005	1.000
L02 L03	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
L04	CHOKE,COATED,47UH	08N470	JEF	1810-03-0470	1.000
MX01	MIXER,DBL.BALANCED	CM-1	VARIL	3010-54-0001	1.000
R01	RES,C,1/4W,5%,9.1K	CF1/4-9.1K	ASE	4700-15-9101	1.000
R02	RES,C,1/4W,5%,5.1K	CF1/4-5.1K	ASE	4700-15-5101	1.000
R03	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	1.000
ZA01	AMP BD, M119-5	M119-5-AMP BD	W-I	1218-00-0433	1.000
ZA02	OSC BD, M119-5	M119-5-OSC BD	W-I	1218-00-0443	1.000
ZA03	PHASE LK BD, M119-5	M119-5-PH LK BD	W-I	1218-00-0453	1.000
ZA04	SWITCH PC ASSY M119-155	M119-155-SW BD	W-I	1218-00-1340	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	FRAME,M119-DP FROM:1410-30-0700	1414-30-1019	W-I	1414-30-1019	1.000
2	INT,LOWASHER,6 HW101-600	1304ZP	F-S	2810-24-6000	1.000
3	CONN JF000-004	27-21	APL	2110-03-0001	2.000
4	BASE,M119 FROM:3210-08-0033	1414-30-1018	W-I	1414-30-1018	1.000
5	INDEX STUD	A001-009	W-I	1410-00-2680	1.000
8	SCW,SBH,6-32X3/16	6-32X3/16,BH,NP	S-S	2810-17-6103	1.000
9	PSK DEMOD CHASSIS CTR PLATE B/P	1410-30-1690	W-I	1410-30-1690	1.000
12	SHIELD PER B/P	A001-912	W-I	1410-00-2430	1.000
13	SHIELD PER B/P	A001-913	W-I	1410-00-2440	1.000
14	SHIELD PER B/P	A01-915	W-I	1410-00-2480	1.000
18	STANDOFF, SWAGE, 3/16 X 1/8	SS151-1A-17	UNIC	2810-05-0909	15.000
26	CAP,FT,500V,6.8PF	54-794-010-6892	SPEC	1510-30-1689	4.000
27	CAP,FT,500V,1000PF	54-794-010-102P	SPEC	1510-30-8102	3.000

WAVETEK PARTS LIST	MODULE ASSY,M119-DP	1216-40-0024 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CONN JF000-008	27-25	APL	2110-03-1004	2.000

WAVETEK PARTS LIST	CABLE ASSY, 3 1/2 IN	1217-70-0061 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
2	TERM,MALE MC000-057	86093-7	AMP	2113-12-0001	1.000
C101 C103 C110 C113	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	4.000
C102 C111	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	2.000
C104 C112	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	2.000
C105	CAP,MICA,100V,200 PF	DM5FA221J	ARC	1510-50-7221	1.000
C106 C108	CAP,COMP,500V,10PF	QC-10PF	Q-C	1510-40-0100	2.000
C107	CAP,MICA,100V,160 PF	DM5FA161J	ARC	1510-50-7161	1.000
C109	CAP,MICA,100V,130PF	ADM-5CA131J	ARC	1510-50-3131	1.000
C114 C115 C116	CAP,VARI,7.35PF,250V CV101-035	7STRIKO-02	STR	1510-70-0350	3.000
L101 L107	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
L102	CHOKE,COATED,2.7UH	08N2R7	JEF	1810-03-0279	1.000
L103	CHOKE,COATED,1.8UH	08N1R8	JEF	1810-03-0189	1.000
L104	CHOKE,COATED,5.6UH	08N5R6	JEF	1810-03-0569	1.000
L105	CHOKE,COATED,6.8UH	08N6R8	JEF	1810-03-0689	1.000
L106	CHOKE,COATED,.47UH	08NR47	JEF	1810-03-0478	1.000
Q101 Q102	TRANS QA050-530	2N5053	APX	4901-05-0530	2.000
R101	RES,C,1/8W,5%,6.8K	CF1/8-6.8K	ASE	4700-05-6801	1.000
R102 R106	RES,C,1/8W,5%,20K	CF1/8-20K	ASE	4700-05-2002	2.000
R103 R107	RES,C,1/8W,5%,10	CF1/8-10	ASE	4700-05-1009	2.000
R104 R108	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	2.000
R105	RES,C,1/8W,5%,4.7K	CF1/8-4.7K	ASE	4700-05-4701	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C201	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	1.000
C202	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	1.000
C203	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	1.000
C205	CAP,MICA,300V,30PF	DM-5ED300J	ARC	1510-50-1300	1.000
C206	CAP,MICA,300V,15PF	DM-5CC150J	ARC	1510-50-1150	1.000
C210	CAP,TANT,25V,1UF	100DE105K25A2	ACI	1510-21-7010	1.000
CR201	DIODE,VARACTOR	BB205B	APX	4803-02-0004	1.000
L201 L202	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
L204	CHOKE,COATED,10UH	08N100	JEF	1810-03-0100	1.000
Q201	TRANS QA050-530	2N5053	APX	4901-05-0530	1.000
R201	RES,C,1/8W,5%,9.1K	CF1/8-9.1K	ASE	4700-05-9101	1.000
R202	RES,C, 1/8W,5%, 5.1K	CF 1/8 -5.1 K	ASE	4700-05-5101	1.000
R203	RES.1/8W,5,330	CF1/8-330	ASE	4700-05-3300	1.000
R205	RES,C,1/8W,5%,20K	CF1/8-20K	ASE	4700-05-2002	1.000
R206	RES,C,1/8W,5%,220	CF1/8-220	ASE	4700-05-2200	1.000
R207 R208	RES,C,1/8W,5%,13	CF-1/8-13	ASE	4700-05-1309	2.000
R209	RES,C,1/8W,5%,1.8K	CF1/8-1.8K	ASE	4700-05-1801	1.000
R209	RES,C,1/4W,5%,1.8K	CF1/4-1.8K	ASE	4700-15-1801	1.000
T201	RF XFMR PER B/P FROM:1813-00-0007	1210-40-0024	W-I	1210-40-0024	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
19	IC SKT,8 PIN	DILB-8P-108	BURND	2112-00-0007	2.000
20	IC SKT,PC,14 PIN MC000-073	C931402	T-I	2112-00-0011	2.000
C301 C302	CAP,MICA,100V,250PF	ADM-10CA251J	ARC	1510-50-5251	2.000
C303	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	1.000
C304 C305 C307 C312 C313 C315 C316 C318	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	8.000
C306 C308 C309 C310 C317	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	5.000
C311	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	1.000
C314	CAP,DISC,1KV,270PF	60U271M	MDC	1510-10-1271	1.000
C319 C320 C322	CAP,MICA,100V,1000PF	ADM-15CA102J	ARC	1510-50-6102	3.000
C321	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	1.000
CR301 CR302 CR303	DIODE,SIGNAL	1N914	G-E	4807-01-0914	3.000
IC301	IF AMP	MC1350P	MOT	7000-13-5000	1.000
IC303	OP AMP,DUAL,3MHZ	NE5530	SIG	7000-55-3000	1.000
IC304	PHASE DETECTOR	MC4044P	MOT	8000-40-4400	1.000
IC304	QUAD NAND STATIC SENSITIVE	MC14011BCP	MOT	8001-40-1112	1.000
L301 L303	CHOKE,COATED,6.8UH	08N6R8	JEF	1810-03-0689	2.000
L304 L305	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
Q301	TRANS QA050-530	2N5053	APX	4901-05-0530	1.000
Q302	TRANS QA039-060	2N3906	T-I	4901-03-9060	1.000
R301	RES,C,1/4W,5%,2.7K	CF1/4-2.7K	ASE	4700-15-2701	1.000
R302 R309 R323 R324 R329 R331	RES,C,1/4W,5%,20K	CF1/4-20K	ASE	4700-15-2002	6.000
R303 R315 R332	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	3.000
R304 R311 R319 R325	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	4.000
R305	RES,C,1/4W,5%,5.6K	CF1/4-5.6K	ASE	4700-15-5601	1.000
R306	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	1.000
R307	RES,C,1/4W,5%,200	CF1/4-200	ASE	4700-15-2000	1.000
R308	RES,C,1/4W,5%,470	CF1/4-470	ASE	4700-15-4700	1.000
R310	RES,C,1/4W,5%,180	CF1/4-180	ASE	4700-15-1800	1.000
R312 R314	RES,MF,1/8W,1%,1K	RN55D-1K	MILSP	4701-03-1001	2.000
R313	RES,C,1/4W,5%,2.7	CF1/4-2.7	ASE	4700-15-2708	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R316	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	1.000
R317	POT,2K,RP144-220 FROM:4610-00-7202	4610-00-4202	W-I	4610-00-4202	1.000
R318	RES,C,1/4W,5%,27K	CF1/4-27K	ASE	4700-15-2702	1.000
R321	RES,MF,1/8W,1%,4.99K	RN55D-4.99K	MILSP	4701-03-4991	1.000
R322	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	1.000
R326	RES,MF,1/8W,1%,11.3K	RN55D-11.3K	MILSP	4701-03-1132	1.000
R327	RES,MF,1/8W,1%,1.50K	RN55D-1.50K	MILSP	4701-03-1501	1.000
R328 R330	RES,C,1/8W,5%,100K	CF1/8-100K	ASE	4700-05-1003	2.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	PSK DEMODULATOR, M119-155	M119-155	W-I	1114-00-0353	1.000
W06	CABLE ASSY, 3 1/2 IN	WX1865-W4	W-I	1217-70-0061	1.000

WAVETEK PARTS LIST	OPT DP-155, DUAL PILOT, 1865	1019-00-0192 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
10	COVER PER B/P	A001-910	W-I	1410-00-2380	1.000
11	COVER PER B/P	A001-911	W-I	1410-00-2390	1.000
16	SCW,SBH,2-56X3/16	4001NP	F-S	2810-17-2103	15.000
17	LOWASHER,INT 2	1330NP	F-S	2810-24-2000	15.000
20	IC SKT,PC,14 PIN MC000-073	C931402	T-I	2112-00-0011	1.000
23	FISHPAPER;PHASE LOCK PER B/P	A001-963	W-I	1410-00-9440	1.000
24	FISHPAPER; BANDPASS PER B/P	A001-964	W-I	1410-00-9450	1.000
25	OSC FISH PAPER B/P	A001-965	W-I	1410-00-9460	1.000
C01 C02 C03	CAP,FT,500V,2200PF	4420-2200PF	AER	1510-31-1222	3.000
C04 C05	CAP,FT,500V,4.7PF	4420-4.7PF	AER	1510-31-4479	2.000
C13	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	1.000
CR01 CR02	DIODE,RECT,400V	1N4004	P-C	4806-01-4004	2.000
IC01	QUAD NAND STATIC SENSITIVE	MC14011BCP	MOT	8001-40-1112	1.000
L01	TOROID,10T,1-1/2L	LA009-010-2	W-I	1810-05-0005	1.000
L02 L03	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
L04	CHOKE,COATED,47UH	08N470	JEF	1810-03-0470	1.000
MX01	MIXER,DBL.BALANCED	CM-1	VARIL	3010-54-0001	1.000
R01	RES,C,1/4W,5%,9.1K	CF1/4-9.1K	ASE	4700-15-9101	1.000
R02	RES,C,1/4W,5%,5.1K	CF1/4-5.1K	ASE	4700-15-5101	1.000
R03	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	1.000
ZA01	AMP ASSY, M119-155	M119-155-AMP BD	W-I	1218-00-0431	1.000
ZA02	OSC ASSY, M119-155s	M119-155-OSC BD	W-I	1218-00-0441	1.000
ZA03	PHASE LOCK BD, M119	M119-PH LK BD	W-I	1218-00-0450	1.000
ZA04	SWITCH PC ASSY M119-155	M119-155-SW BD	W-I	1218-00-1340	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C101 C110 C113	CAP,DISC,1KV,470PF	60U471M	MDC	1510-10-1471	3.000
C103	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	1.000
C104 C112	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	2.000
C105 C107	CAP,MICA,300V,6PF	DM-5CC060D	ARC	1510-50-1609	2.000
C106 C108	CAP,COMP,500V,.36PF	MC 36PF	Q-C	1510-40-1368	2.000
C109	CAP,MICA,300V,5PF	DM-5CC050D	ARC	1510-50-1509	1.000
C111	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	1.000
L101 L107	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
L102	COIL,AIR,4T,.200 ID	4T,PER SPEC.	ATR	1815-00-0003	1.000
L103	COIL,AIR,3T,.200 ID	3T,PER SPEC.	ATR	1815-00-0002	1.000
L104	COL,AIR,6T,.200 ID	6T,PER SPEC.	ATR	1815-00-0004	1.000
L105	COIL,7T,.2ID,PER B/P	1815-00-0029	W-I	1815-00-0029	1.000
L106	COIL,AIR,2T,0.200 ID	2T,PER SPEC.	ATR	1815-00-0001	1.000
Q101 Q102	TRANS QA050-530	2N5053	APX	4901-05-0530	2.000
R102	RES,C,1/8W,5%,20K	CF1/8-20K	ASE	4700-05-2002	1.000
R103 R107	RES,C,1/8W,5%,10	CF1/8-10	ASE	4700-05-1009	2.000
R104 R108	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	2.000
R105	RES,C,1/8W,5%,6.8K	CF1/8-6.8K	ASE	4700-05-6801	1.000
R106	RES,C,1/8W,5%,15K	CF 1/8-15K	ASE	4700-05-1502	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C201	CAP,NON,50V,1UF	3420-050-E105M	AER	1510-11-3105	1.000
C202 C203	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	2.000
C204	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	1.000
C205	CAP,MICA,500V,.001UF	DM15-102J	ARC	1510-50-0102	1.000
C206 C209	CAP,MICA,300V,4PF	DM5-040D	ARC	1510-50-1409	2.000
C207	CAP,MICA,300V,12PF	DM-5CC120J	ARC	1510-50-1120	1.000
C208	CAP,MICA,300V,3PF	DM5-030D	ARC	1510-50-1309	1.000
C210	CAP,TANT,25V,1UF	100DE105K25A2	ACI	1510-21-7010	1.000
CR201	DIODE,VARACTOR	BB205B	APX	4803-02-0004	1.000
L201 L202	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
L203	COIL,4-1/2T,#22 .200 ID,1/4 LEADS	1815-00-0017	W-I	1815-00-0017	1.000
L204	COIL,AIR,2T,0.200 ID	2T,PER SPEC.	ATR	1815-00-0001	1.000
Q201	TRANS QA050-530	2N5053	APX	4901-05-0530	1.000
R201	RES,C,1/8W,5%,9.1K	CF1/8-9.1K	ASE	4700-05-9101	1.000
R202	RES,C, 1/8W,5%, 5.1K	CF 1/8 -5.1 K	ASE	4700-05-5101	1.000
R203	RES.1/8W,5,330	CF1/8-330	ASE	4700-05-3300	1.000
R204	RES,C,1/8W,5%,47	CF1/8-47	ASE	4700-05-4709	1.000
R205	RES,C,1/8W,5%,20K	CF1/8-20K	ASE	4700-05-2002	1.000
R206 R208	RES.C.1/8W 5% 470	CF1/8-470	ASE	4700-05-4700	2.000
R207	RES,C,1/8W,5%,27	CF1/8-27	ASE	4700-05-2709	1.000
R209	RES,C,1/8W,5%,1.8K	CF1/8-1.8K	ASE	4700-05-1801	1.000

WAVETEK PARTS LIST	OSC ASSY, M119-155 S	1218-00-0441 PAGE: 1	B REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C301 C302	CAP,MICA,100V,250PF	ADM-10CA251J	ARC	1510-50-5251	2.000
C303	CAP,DISC,1KV,.001UF	5GAD10	SPR	1510-10-1102	1.000
C304 C305 C307 C312 C313 C315 C316 C318	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	8.000
C306 C308 C309 C310 C317	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	5.000
C311	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	1.000
C314	CAP,DISC,1KV,270PF	60U271M	MDC	1510-10-1271	1.000
C319 C320	CAP,MICA,500V,.001UF	DM15-102J	ARC	1510-50-0102	2.000
C321	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	1.000
CR301 CR302 CR303	DIODE,SIGNAL	1N914	G-E	4807-01-0914	3.000
IC301	IF AMP	MC1350P	MOT	7000-13-5000	1.000
IC302	PHASE DETECTOR	MC4044P	MOT	8000-40-4400	1.000
IC303	OP AMP,DUAL,3MHZ	NE5530	SIG	7000-55-3000	1.000
IC304	QUAD NAND STATIC SENSITIVE	MC14011BCP	MOT	8001-40-1112	1.000
L301 L303	CHOKE,COATED,6.8UH	08N6R8	JEF	1810-03-0689	2.000
L302	CHOKE,COATED,3.9UH	08N3R9	JEF	1810-03-0399	1.000
L304 L305	TOROID,10T,1-1/4L	LA009-010-1	W-I	1810-05-0004	2.000
Q301	TRANS QA050-530	2N5053	APX	4901-05-0530	1.000
Q302	TRANS QA039-060	2N3906	T-I	4901-03-9060	1.000
R301	RES,C,1/4W,5%,2.7K	CF1/4-2.7K	ASE	4700-15-2701	1.000
R301	RES,C,1/4W,5%,7.5K	CF1/4-7.5K	ASE	4700-15-7501	1.000
R302 R309 R323 R324 R329 R331	RES,C,1/4W,5%,20K	CF1/4-20K	ASE	4700-15-2002	6.000
R303 R315 R332	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	3.000
R304 R311 R319 R325	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	4.000
R305	RES,C,1/4W,5%,5.6K	CF1/4-5.6K	ASE	4700-15-5601	1.000
R306	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	1.000
R307	RES,C,1/4W,5%,200	CF1/4-200	ASE	4700-15-2000	1.000
R308	RES,C,1/4W,5%,470	CF1/4-470	ASE	4700-15-4700	1.000
R310	RES,C,1/4W,5%,180	CF1/4-180	ASE	4700-15-1800	1.000
R312 R314	RES,MF,1/8W,1%,1K	RN55D-1K	MILSP	4701-03-1001	2.000
R313	RES,C,1/4W,5%,2.7	CF1/4-2.7	ASE	4700-15-2708	1.000
R316	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R317	POT,2K,RP144-220 FROM:4610-00-7202	4610-00-4202	W-I	4610-00-4202	1.000
R318	RES,C,1/4W,5%,27K	CF1/4-27K	ASE	4700-15-2702	1.000
R321	RES,MF,1/8W,1%,4.99K	RN55D-4.99K	MILSP	4701-03-4991	1.000
R322	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	1.000
R326	RES,MF,1/8W,1%,11.3K	RN55D-11.3K	MILSP	4701-03-1132	1.000
R327	RES,MF,1/8W,1%,1.50K	RN55D-1.50K	MILSP	4701-03-1501	1.000
R328 R330	RES,C,1/8W,5%,100K	CF1/8-100K	ASE	4700-05-1003	2.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
C401 C402 C403 C404 C405 C406	CAP.,CHIP,.1 MF	51C1209-B104Z	CFI	1510-00-3104	6.000
CR401 CR402 CR403 CR404	DIODE DG000-014	BA182	APX	4812-02-0003	4.000
R401 R405	RES,C,1/8W,5%,1K RC101-210	CF1/8-1K	ASE	4700-05-1001	2.000
R402 R403 R404	RES,C,1/8W,5%,2K	CF1/8-2K	ASE	4700-05-2001	3.000

WAVETEK PARTS LIST	SWITCH PC ASSY M119-155	1218-00-1340 PAGE: 1	B REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
2	CASE/CHAS INTFC BD	1865-3-CASE/CHAS BD	W-I	1110-00-9003	1.000
3	OPT/INTFC BD	1855-INTFC BD	W-I	1110-00-9002	1.000
4	PC ASSY, CD RDR OPT	CRW-1-PC	W-I	1110-00-9001	1.000
6	PLATE,MTG,PER B/P	1414-00-0002	W-I	1414-00-0002	1.000
7	GASKET,MTG PLATE, PER B/P	1414-00-0003	W-I	1414-00-0003	1.000
8	NUT PLATE ASSY	1111-00-9001	W-I	1111-00-9001	2.000
9	DECAL,CARD READEROPT	DMA-500	W-I	2410-04-0459	2.000
10	CABLE CLAMP,FLAT,3/8	CFCC-4	RICH	2810-00-0019	1.000
11	CAP,SEALING,W/CHAIN	208652-1	AMP	2113-33-0004	1.000
12	CARD GUIDE,4-1/2 IN	11633-2	SCBE	2112-16-0008	2.000
13	FISH PAPER,PER B/P	1414-00-0005	W-I	1414-00-0005	1.000
14	FISHPAPER PER B/P	1410-30-1190	W-I	1410-30-1190	1.000
15	SCW,SBH,2-56X1/2	4006NP	F-S	2810-17-2108	8.000
16	SCW,SBH,4-40X5/16	4023NP	F-S	2810-17-4105	1.000
17	CABLE CLAMP,1/8	3302	HEY	2810-00-0011	1.000
18	LOWASHER,INT 2	1330NP	F-S	2810-24-2000	8.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
2	IC SKT,PC,14 PIN MC000-073	C931402	T-I	2112-00-0011	5.000
3	IC SKT,16 PIN MC000-074	DILB-16P-108	BURND	2112-00-0012	8.000
4	IC SKT,PC,24 PIN MC000-126	C932402	T-I	2112-00-0013	2.000
C01	CAP,DISC,100V,.01UF	68U103M	MDC	1510-10-2103	1.000
C02 C04 C05 C06 C07 C08 C09 C10	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	8.000
C03	CAP,ELEC,50V,10UF	TE1304	SPR	1510-20-5100	1.000
J10	HEADER,R.A.,20-PIN	FCC-251-20	AWC	2112-08-0025	1.000
R01	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	1.000
R2	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	1.000
R03	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	1.000
RN01 RN02 RN03	RES NTWK,SIP,9-470K	109-474J	EPITK	4770-00-0011	3.000
U01	HEX INVERTER STATIC SENSITIVE	CD4049UBE	RCA	8000-40-4912	1.000
U02	QUAD AND GATE STATIC SENSITIVE	MC14081BCP	MOT	8001-40-8110	1.000
U03 U04 U06	DUAL D, FLIP-FLOP STATIC SENSITIVE	MC14013BCP	MOT	8001-40-1310	3.000
U05	COUNTER,14 STAGE BIN STATIC SENSITIVE	CD4020BE	RCA	8000-40-2002	1.000
U07	QUAD NAND STATIC SENSITIVE	MC14011BCP	MOT	8001-40-1112	1.000
U08	N-BIT,1 OF 8 DECODER STATIC SENSITIVE	CDP1853CE	RCA	8000-18-5310	1.000
U09	USE 8001-40-4210	8000-40-4210	W-I	8000-40-4212	1.000
U10 U11 U12 U13	QUAD D, REGISTER STATIC SENSITIVE	MC14076BAP	MOT	8001-40-7610	4.000
U14	PROM, MOD1,CD RDR OPT FROM;8000-25-1610	8410-00-0016	W-I	8410-00-0016	1.000

WAVETEK PARTS LIST	PC ASSY, CD RDR OPT	1110-00-9001 PAGE: 1	C REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	PC BD,ZZ1010A	ZZ1010A	W-I	1710-00-3600	1.000
5	SPACER,THD,4-40X3/8 HD101-406	108303NP	F-S	2810-02-4106	2.000
6	SCW,SBH,4-40X1/4	4022NP	F-S	2810-17-4104	2.000
7	WASH,LOCK,SPRING,4	1355	F-S	2810-28-0038	2.000
8	TERMINAL,HT104-003	1559-2	KEY	2112-19-0001	2.000
J26	HDR,STRT,DBL 20-PIN	65611-420	BERG	2112-07-0068	1.000

WAVETEK PARTS LIST	OPT/INTFC BD	1110-00-9002 PAGE: 1	B REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
6	CABLE CLAMP,FLAT,1	CFCC-8	RICH	2810-00-0012	2.000
J27	CONN ASSY	1216-00-9003	W-I	1216-00-9003	1.000

WAVETEK PARTS LIST	CASE/CHAS INTFC BD	1110-00-9003 PAGE: 1	C REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	PLATE,NUT,PER B/P	1414-00-0007	W-I	1414-00-0007	1.000
2	NUT,PRESS,2-56	S-256-2CI	PEM	2810-09-0011	2.000

WAVETEK PARTS LIST	NUT PLATE ASSY	1111-00-9001 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
2	CONN,PC,20-PIN	FCC-140-20	AWC	2112-35-0002	1.000
4	TERM,MINI-PV,STRIP	47437	BER	2113-20-0002	19.000
5	PLUG,POLARIZING MC000-117	65307-001	BER	2113-23-0001	1.000
P26	CONN,MINI-LATCH,2X10	65043-027	BER	2113-28-0005	1.000

WAVETEK PARTS LIST	CS/CHAS INFC HARNESS	1219-40-0085 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
2	CONN,PC,20-PIN	FCC-140-20	AWC	2112-35-0002	1.000
4	TERM,RING,NO.4,INSUL	4972	HHS	2112-03-0021	1.000
9	TERM,MINI-PVMC000-092	47217	BER	2113-20-0001	1.000
17	WIRE,24GA,BK FROM:6012-12-4999	6012-12-4000	W-I	6012-12-4000	12.000
18	WIRE,24GA,RD FROM:6012-12-4999	6012-12-4222	W-I	6012-12-4222	7.000
J18	HSG,MINI-LATCH,2-PIN	65039-035	BER	2113-10-0015	1.000
P10	SOCKET,RIBBON CABLE, 20 CKT.	FCC-210-20	AWC	2112-36-0001	1.000

WAVETEK PARTS LIST	CHA/OPT BD,INFC HARN	1219-40-0086 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CHASSIS, CD RDR	1216-00-9001	W-I	1216-00-9001	1.000
2	ENCLOSURE,PER B/P FROM:3210-12-0007	1414-30-0001	W-I	1414-30-0001	1.000
4	DUST COVER,PER B/P	1414-60-0000	W-I	1414-60-0000	1.000
5	FOOT,RUBBER,6-32STUD	MB-50	PHILP	2810-08-0011	4.000
6	GROMMET,CAN,8.31 REF:3210-06-0030	2810-10-0032	W-I	2810-10-0032	1.000
7	SCW,SBH,6-32X5/16	4033NP	F-S	2810-17-6105	4.000
8	MAG CARD	3010-15-0001	W-I	3010-15-0001	10.000
9	CARD,HEAD CLEANER	3010-15-0002	W-I	3010-15-0002	1.000
10	MAG CARD HOLDER	3010-10-0007	W-I	3010-10-0007	10.000
11	CLEANING CARD HOLDER	3010-10-0008	W-I	3010-10-0008	1.000
12	DECAL,SER.NO.	DMB-11	W-I	2410-04-0001	1.000
13	FOAM PAD,PER B/P	1414-00-0010	W-I	1414-00-0010	1.000
14	FOAM LINER,PER B/P REF:1610-99-0004	1414-00-0009	W-I	1414-00-0009	1.000
15	FOAM LINER PER B/P REF:1610-99-0004	1414-00-0008	W-I	1414-00-0008	1.000

WAVETEK PARTS LIST	CARD READER ASSY	1118-00-9001 PAGE: 1	C REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	PC ASSY, CD RDR	CRW-I-PC	W-I	1218-00-9001	1.000
2	HARNESS, CRW-1	WYCRW-1	W-I	1219-00-9001	1.000
3	MAG CARD RDR,PER BP	3010-56-0001	W-I	3010-56-0001	1.000
4	MTG PLATE ASSY	1216-00-9002	W-I	1216-00-9002	1.000
5	BALANCE WEIGHTPER B/P	1414-00-0006	W-I	1414-00-0006	1.000
6	SPACER,HEX,6-32X1	9508	F-S	2810-02-6116	4.000
7	SPACER,HEX 6-32X5/8	108325	F-S	2810-02-6110	4.000
8	GROMMET,PLASTIC,1.19 REF;3210-06-0031	2810-10-0030	W-I	2810-10-0030	1.000
9	GROMMET,PLASTIC,.44 REF;3210-06-0031	2810-10-0031	W-I	2810-10-0031	1.000
10	CABLE CLAMP,1/8	3302	HEY	2810-00-0011	1.000
11	SCW,SBH,6-32X3/8	4034NP	F-S	2810-17-6106	9.000
12	SCW,SBH,6-32X1/4	6-32X1/4,UC,BH,NP	S-S	2810-17-6104	4.000
13	SCW,SBH,6-32X1/2	4036NP	F-S	2810-17-6108	1.000
14	LWASHER,SPLIT,6 HW107-600	1358NP	F-S	2810-28-0019	14.000
15	CABLE TIE,4	PLTIM-MP	PAND	2810-00-0010	2.000

WAVETEK PARTS LIST	CHASSIS, CD RDR	1216-00-9001 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	PLATE,MTG,PER B/P	1414-60-0001	W-I	1414-60-0001	1.000
2	STUD,SELF-CLINCH, 6-32X1/2	FH-632-8CI	PEM	2810-47-0001	8.000
3	NUT,PRESS,6-32	S-632-3CI	PEM	2810-09-0010	8.000

WAVETEK PARTS LIST	MTG PLATE ASSY	1216-00-9002 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	RECPT,16 CKT,FLANGED	206036-1	AMP	2113-11-0003	1.000
2	PIN,MALE,WIRE-WRAP	66460-7	AMP	2113-12-0003	16.000
3	SEAL,AMP CONN,.875	206403-2	AMP	2113-33-0003	1.000
4	NUT,PRESS,2-56	S-256-2CI	PEM	2810-09-0011	4.000

WAVETEK PARTS LIST	CONN ASSY	1216-00-9003 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
2	IC SKT,8 PIN	DILB-8P-108	BURND	2112-00-0007	8.000
3	IC SKT,PC,14 PIN MC000-073	C931402	T-I	2112-00-0011	11.000
4	IC SKT,16 PIN MC000-074	DILB-16P-108	BURND	2112-00-0012	3.000
5	SCW,SBH,6-32X1/4	6-32X1/4,UC,BH,NP	S-S	2810-17-6104	4.000
6	INT,LOWASHER,6 HW101-600	1304ZP	F-S	2810-24-6000	4.000
7	NUT,6-32X1/4HN101-600	8005NP	F-S	2810-14-6100	4.000
8	WASH,NO.6,5/160.D.	97311	F-S	2810-26-0015	2.000
9	WASH,INAULRING	43-77-2	THR	2810-28-0039	2.000
C01 C14	CAP,MICA,500V,200PF	DM15-201J	S-F	1510-50-0201	2.000
C02	CAP,MICA,500V,100PF	DM15-101J	C-D	1510-50-0101	1.000
C03 C04 C06 C15	CAP,TANT,25V,1UF	100DE105K25A2	ACI	1510-21-7010	4.000
C05 C09 C10 C17	CAP,MICA,500V,.001UF	DM15-102J	ARC	1510-50-0102	4.000
C07	CAP,MICA,500V,510PF	DM-15-511J	ARC	1510-50-0511	1.000
C08	CAP,MICA,500V,2000PF	DM19-202J	ARC	1510-50-0202	1.000
C11 C19	CAP,TANT,25V,10UF	100DE106M20C2	ACI	1510-21-7100	2.000
C12	CAP,TANT,35V,47UF	T310D476-035AS	UNCAR	1510-22-4470	1.000
C13	CAP,MICA,500V,680PF	DM15-681J	ARC	1510-50-8681	1.000
C16	CAP,MICA,300V,10PF	DM-5CC100J	ARC	1510-50-1100	1.000
C18	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	1.000
CR01 CR02	DIODE,SIGNAL	1N914	G-E	4807-01-0914	2.000
J01	HEADER,RA,6-PIN REF:2112-08-0005	2112-08-0024	W-I	2112-08-0024	1.000
L01	CHOKE,MOLDED,510UH	2500-14	DEL	1810-01-5100	1.000
Q01 Q02	PROT PWR DARLINGTON	LM395T	NAT	4902-00-3950	2.000
Q03 Q04	POWER,FET SCX VN46AF SCX, STATIC SENS.	VN46AF	SCX	4902-00-0460	2.000
R01 R02 R03 R07 R13 R27 R28 R29 R30 R31 R37 R39 R40 R41	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	14.000
R04	RES,C,1/4W,5%,15	CF1/4-15	ASE	4700-15-1509	1.000
R05	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	1.000
R06	RES,MF,1/8W,1%,182K	RN55D-182K	MILSP	4701-03-1823	1.000
R08 R36	RES,C,1/4W,5%,1M	CF1/4-1M	ASE	4700-15-1004	2.000

WAVETEK PARTS LIST	PC ASSY, CD RDR	1218-00-9001 PAGE: 1	F REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
R09	RES,C,1/4W,5%,560K	CF1/4-560K	ASE	4700-15-5603	1.000
R10 R11	RES, MF,1/8W,1%,475	RN55D-475	MILSP	4701-03-4750	2.000
R12	RES,MF,1/8W,1%,3.92K	RN55D-3.92K	MILSP	4701-03-3921	1.000
R14 R15 R16 R22 R24 R35	RES,C,1/4W,5%,4.7K	CF1/4-4.7K	ASE	4700-15-4701	6.000
R17 R18	RES,MF,1/8W,1%,10K	RN55D-10K	MILSP	4701-03-1002	2.000
R20 R21	RES,C,1/4W,5%,2K	CF1/4-2K	ASE	4700-15-2001	2.000
R23 R25 R38	RES,C,1/4W,5%,1K	CF1/4-1K	ASE	4700-15-1001	3.000
R26	RES,C,1/4W,5%,470K	CF1/4-470K	ASE	4700-15-4703	1.000
R32	RES,C,1/4W,5% 1.3K	CF1/4-1.3K	ASE	4700-15-1301	1.000
R33 R34	RES,C,1/4W,5%,39K	CF1/4-39K	ASE	4700-15-3902	2.000
U01 U02	QUAD ANALOG SWITCH STATIC SENSITIVE	MC14066BCP	MOT	7001-40-6612	2.000
U03 U04	OP AMP,DUAL,3MHZ	NE5530	SIG	7000-55-3000	2.000
U05	IC,IL004-001	LM339N	NAT	7000-03-3900	1.000
U06 U08 U14 U15 U16	QUAD NAND STATIC SENSITIVE	MC14011BCP	MOT	8001-40-1112	5.000
U07	DUAL MONOSTABLE F-F STATIC SENSITIVE	MC14538BCP	MOT	8001-45-3812	1.000
U09 U20	HEX INVERTER STATIC SENSITIVE	CD4049UBE	RCA	8000-40-4912	2.000
U10 U11 U12 U13 U17 U22	DUAL 2-INP NAND DRVR STATIC SENSITIVE	CD40107BE	RCA	8004-01-0712	6.000
U18	DUAL D, FLIP-FLOP STATIC SENSITIVE	MC14013BCP	MOT	8001-40-1310	1.000
U19	DUAL AND-OR-INVERT STATIC SENSITIVE	CD4085BE	RCA	8000-40-8512	1.000
U21	TRIPLE 3-INP NAND STATIC SENSITIVE	CD4023BE	RCA	8000-40-2312	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	BRKT,CABLE,PER B/P	1414-00-0004	W-I	1414-00-0004	1.000
2	STRAIN RELIEF,.625	1220	HEY	2810-37-0008	1.000
3	CABLE, 15 COND,RETR	6011-70-0003	W-I	6011-70-0003	1.000
4	TERM,MINI-PVMC000-092	47217	BER	2113-20-0001	15.000
5	PLUG,POLARIZING MC000-117	65307-001	BER	2113-23-0001	1.000
6	SOCKET FOR AMP PLUG	66105-1	AMP	2113-12-0002	15.000
7	STRAIN RELIEF FROM:2113-33-0001	2113-33-0002	W-I	2113-33-0002	1.000
8	CABLE GRIP FROM:2113-34-0001	2113-34-0002	W-I	2113-34-0002	1.000
P03	CONN,MINI-LATCH,2X8	65043-029	BER	2113-28-0004	1.000
P27	PLUG,16 CKT	206037-1	AMP	2113-11-0002	1.000

WAVETEK PARTS LIST	HARNESS, CRW-1	1219-00-9001 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	ME-1 PC ASSY	ME-1-PC	W-I	1110-40-9010	1.000
2	HARNESS,BATT BACKUP	WY1865-BATT	W-I	1219-40-9009	1.000
3	CARD GUIDE,4-1/2 IN	11633-2	SCBE	2112-16-0008	2.000
4	DECAL,ME-1 OPTION	2414-04-9001	W-I	2414-04-9001	2.000
IC307	PROM,MEM EXP INTFC,L FROM:8000-25-1610	8410-00-0021	W-I	8410-00-0021	1.000
IC308	PROM,MEM EXP INTFC,R FROM:8000-25-1610	8410-00-0022	W-I	8410-00-0022	1.000

WAVETEK PARTS LIST	OPT ME-1	1019-40-9012 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	PC BOARD,REVB	1714-00-9002	W-I	1714-00-9002	1.000
2	IC SKT,PC,14 PIN MC000-073	C931402	T-I	2112-00-0011	2.000
3	IC SKT,16 PIN MC000-074	DILB-16P-108	BURND	2112-00-0012	4.000
4	IC SKT,PC,24 PIN MC000-126	C932402	T-I	2112-00-0013	8.000
5	IC, SKT,28-PIN	C842802	T-I	2112-00-0023	2.000
6	IC SKT,8 PIN	DILB-8P-108	BURND	2112-00-0007	1.000
C01 C02 C03 C04	CAP,DISC,100V,.15UF	CY20A154M	C-L	1510-11-1154	4.000
C05 C06 C07	CAP,MON,50V,1UF	3420-050-E105M	AER	1510-11-3105	3.000
C08	CAP,MICA,100V,1000PF	ADM-15CA102J	ARC	1510-50-6102	1.000
C09 C10 C11	CAP,TANT,20V,100UF	T310D107-020AS	UNCAR	1510-22-3101	3.000
CR01	DIODE,RECT,50V	IN5802	UNIT	4806-01-5802	1.000
CR02 CR03	DIODE,SIGNAL	1N914	G-E	4807-01-0914	2.000
IC01	QUAD NAND STATIC SENSITIVE	MC14011BCP	MOT	8001-40-1112	1.000
IC02	QUAD TRUE CMPLT BFFR STATIC SENSITIVE	CD4041AE	RCA	8000-40-4110	1.000
IC03	PROM, AVERAGER FROM:8000-25-1610	8410-00-0024	W-I	8410-00-0024	1.000
IC04	PROM, NORMALIZER FROM:8000-25-1610	8410-00-0025	W-I	8410-00-0025	1.000
IC06	PROM, STACKER FROM:8000-25-1610	8410-00-0023	W-I	8410-00-0023	1.000
IC07 IC12	DIVIDER,PGM,8-BYTE STATIC SENSITIVE	CDP1855CE	RCA	8000-18-5510	2.000
IC8 IC9	STATIC RAM,2048 X 8 STATIC SENSITIVE	TC5517AP	TSHBA	8000-55-1710	2.000
IC13 IC14	QUAD LATCH STATIC SENSITIVE	MC14042BCP	MOT	8001-40-4210	2.000
IC15	DCDR/DEMUXR	SN74LS138N	T-I	8007-41-3810	1.000
IC16	PULSE WD MOD CTL CKT	TL494CN	T-I	8000-04-9400	1.000
IC17	VOLT REF, PGMBL	ICL8212CPA	INTSL	7000-82-1200	1.000
L01	CHOKE,MOLDED,510UH	2500-14	DEL	1810-01-5100	1.000
L02	COIL,110 T REF:1813-00-0031	1210-30-0008	W-I	1810-06-0002	1.000
P41	HDR,RA,3-PIN REF:2112-08-0000	2112-08-0018	W-I	2112-08-0018	1.000

WAVETEK PARTS LIST	ME-1 PC ASSY	1110-40-9010 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
Q01	TRANS QA039-060	2N3906	T-I	4901-03-9060	1.000
R01 R02	RES NTWK,SIP,9-470K	109-474J	EPITK	4770-00-0011	2.000
R03 R04	RES,C,1/4W,5%,100K	CF1/4-100K	ASE	4700-15-1003	2.000
R05	RES NTWK,SIP,9-10K	109-103J	EPITK	4770-00-0012	1.000
R06	RES,MF,1/8W,1%,200K	RN55D-200K	MILSP	4701-03-2003	1.000
R07	RES,C,1/4W,5%,51K	CF1/4-51K	ASE	4700-15-5102	1.000
R08	RES,MF,1/8W,1%,10K	RN55D-10K	MILSP	4701-03-1002	1.000
R09	RES,C,1/4W,5%,100	CF1/4-100	ASE	4700-15-1000	1.000
R10	POT,CERMET,20K	A2B203	A-B	4610-13-4203	1.000
R11	RES,C,1/4W,5%,10K	CF1/4-10K	ASE	4700-15-1002	1.000
R12	RES,C,1/4W,5%,200K	CF1/4-200K	ASE	4700-15-2003	1.000
R13	RES,C,1/4W,5%,360K	CF1/4-360K	ASE	4700-15-3603	1.000
R14	RES,C,1/4W,5%,56K	CF1/4-56K	ASE	4700-15-5602	1.000
R15	RES,C,1/4W,5%,3.9K	CF1/43.9K	ASE	4700-15-3901	1.000
R16	RES,C,1/4W,5%,4.7K	CF1/4-4.7K	ASE	4700-15-4701	1.000
R17	POT,CERMET,100K	A2B104	A-B	4610-13-4104	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	ADAPTER,DUAL SPADE	5081(HHS)	HHS	2112-03-0033	2.000
2	TERM,MINI-PVMC000-092	47217	BER	2113-20-0001	2.000
3	PLUG,POLARIZING MC000-117	65307-001	BER	2113-23-0001	1.000
J41	HSG,MINI-LATCH,3-PIN MC000-128	65039-034	BER	2113-10-0008	1.000
R101	RES,C,1/4W,5%,10	CF1/4-10	ASE	4700-15-1009	1.000

WAVETEK PARTS LIST	HARNESS,BATT BACKUP	1219-40-9009 PAGE: 1	REV

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
1	CHASSIS BATTERY CHARGER-BC3	1410-60-1810	W-I	1410-60-1810	1.000
2	COVER(BATT.CHG. BC3)	1410-30-1870	W-I	1410-30-1870	1.000
5	STRAIN REL. BUSHING HB104-002	SR-5P-4 BLK	HEY	2810-37-0001	2.000
6	FUSEHOLDER,BODY WITH MTNG.NUT	031.1653	PCC	2410-05-0010	1.000
7	FUSE CARRIER, 3AG	031.1666	PCC	2410-05-0009	1.000
8	SHIELD,FUSE HOLDER HZ000-001	331	HHS	2810-12-0012	1.000
9	FEET,HH102-002	PP-40013	BUCK	2810-08-0003	4.000
10	RIVET.1/8X5/16	1162-0408	AVDEL	2810-30-0007	2.000
11	DECAL,WARNING 3000RP	RPD-41	W-I	2410-04-0299	1.000
12	DECAL,SER.NO.	DMB-11	W-I	2410-04-0001	1.000
13	SCW,SBH,6-32X3/8	4034NP	F-S	2810-17-6106	12.000
14	INT,LOWASHER,6 HW101-600	1304ZP	F-S	2810-24-6000	12.000
28	A C COVER PER B/P	1410-01-1530	W-I	1410-01-1530	1.000
29	NUT,6-32X1/4HN101-600	8005NP	F-S	2810-14-6100	1.000
30	GROUND LUG,#6,INT HG102-600	38-111	F-S	2112-03-0003	7.000
CR01	DIODE,RECT,200V	1N5624	G-E	4806-01-5624	1.000
CR02	LED,RED,T-1-3/4	NSL5046	NAT	4810-02-0001	1.000
F01	FUSE,S.B.,2AMP	MDX-2	BUS	2410-05-0001	1.000
HH1	HARNESS,BC-3-A	WYBC-3-A	W-I	1219-00-0324	1.000
HH2	HARNESS,BC-3-B	WYBC-3-B	W-I	1219-00-0325	1.000
HH3	HARNESS,BC-3-C	WYBC-3-C	W-I	1219-00-0326	1.000
HH4	HARNESS,BC-3-D	WYBC-3-D	W-I	1219-00-0327	1.000
P01	CORD SET,18/3SVT,6FT BK,MLD.CAP,UL-APPRV	6011-80-0001	ECMC	6011-80-0001	1.000
PS1	POWER SUPPLY,AC,15V	ES-15E	PWRMT	4010-00-0004	1.000
R01	RES,C,1W,5%,360	GB3615	A-B	4700-35-3600	1.000
S02	SWITCH,SLIDE,DPDT	4021.0512	MARQ	5105-00-0011	1.000

REFERENCE DESIGNATORS	PART DESCRIPTION	>< ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
15	HEATER CORD,2 COND, 18 GA.	19328	BEL	6014-51-8000	4.000
J2	CONN,FEM,PER B/P FROM:2113-29-0001	2113-29-0003	W-I	2113-29-0003	1.000

WAVETEK PARTS LIST	HARNESS,BC-3-A	1219-00-0324 PAGE: 1	A REV

REFERENCE DESIGNATORS	PART DESCRIPTION	ORIG-MFGR-PART-NO	MFGR	WAVETEK NO.	QTY
15	WIRE,18,BL FROM:6012-31-8999	6012-31-8666	W-I	6012-31-8666	13.000
16	WIRE,18,BN FROM:6012-31-8999	6012-31-8111	W-I	6012-31-8111	22.000
S01	SWITCH,TOGGLE DPDT	9201F3HZQ	C-K	5106-00-0016	1.000

WAVETEK PARTS LIST	HARNESS,BC-3-C	1219-00-0326 PAGE: 1	B REV

SECTION 8
SCHEMATIC LIST
1855B

Top View
Bottom View
Wiring Dagram
Main Boards 1 & 2
DPS10 PC Layout
DPS10 Schematic
Front Panel Board Schematic
Microprocessor Board Schematic
Latch Card, Schematic
Ramp Card PC Layout
Ramp Card Schematic
M135-50 Schematic
M171 PC Layout
M171 Schematic
M9L-1 Schematic
M138 PC Layout
M138 Schematic

SCHEMATIC LIST
1865B

Top View
Bottom View
Wiring Diagram
M117 Schematic
M118 Schematic
M119-50/-155/-43 Band Pass
M119 Phase Lock PC Layout
M119-50 Schematic
CRT Schematic
Timing Card PC Layout
Timing Card Schematic
Register Card PC Layout
Register Card Schematic
Microprocessor Card PC Layout
Microprocessor Card Schematic
A/D Card PC Layout
A/D Card Schematic
Power Supply DPS5 Layout
Power Supply DPS5 Schematic
Power Supply DPS3 & 4 Layout
Power Supply DPS4 Schematic
Power Supply DPS3 Schematic
Power Supply DPS1 & 2 Layout
Power Supply DPS1 & 2 Schematic

SCHEMATIC LIST

OPTIONS

M135-5 Schematic

M135-155 Diode Switch PC Layout

M135-155 PC Layout

M135-155 Schematic

M119-155 Osc. PC Layout

M119-155 Diode Switch PC Layout

M119-155 Schematic

M119-5 Osc. PC Layout

M119-5 Band Pass Amp PC Layout

M119-5 Schematic

M113 Pilot Carrier Notch Schematic

M152 PC Layout

M152 Schematic

BC-3 Wiring Diagram

BC-3 PC Layout

BC-3 PC Schematic

CRW-1 Installation Assembly Drawing

CRW-1/1865 Mod. Kit Wiring Diagram

CRW-1/1865 Interface Wiring Diagram

CRW-1/1865 Option Board Schematic

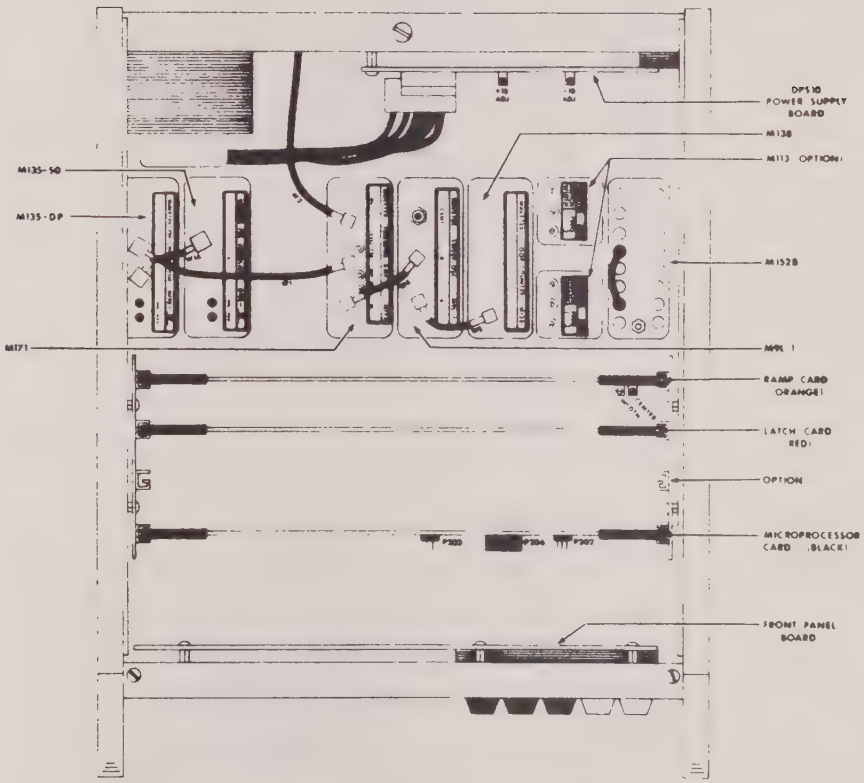
CRW-1 Wiring Diagram

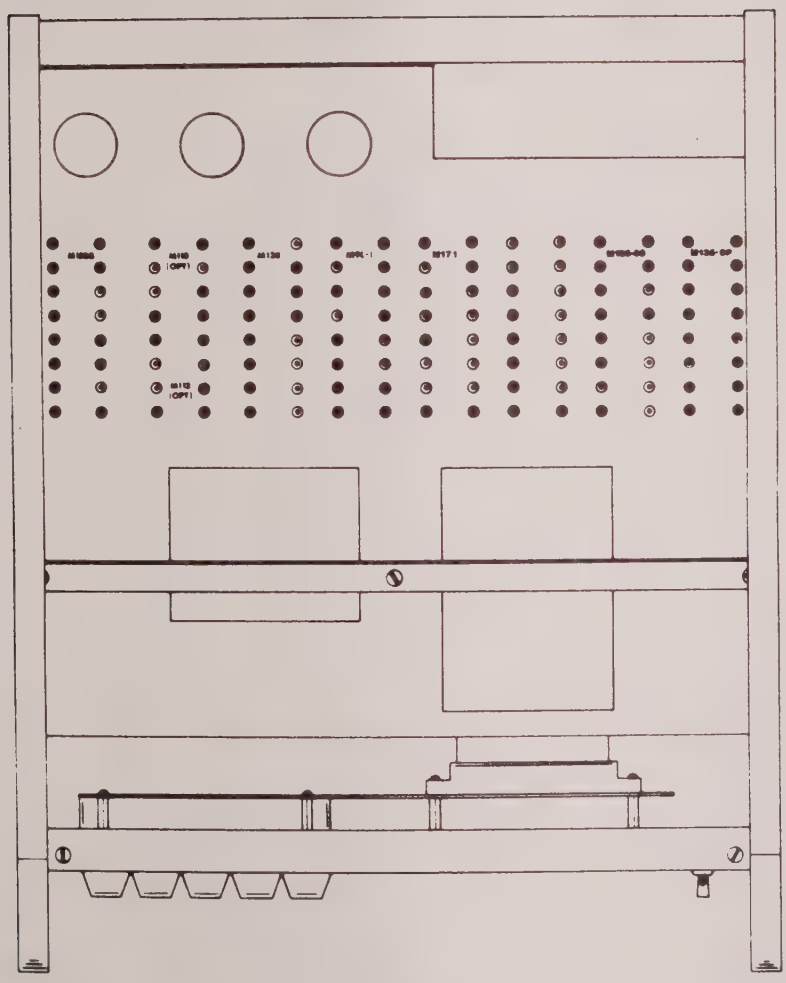
Card Reader Board PC Layout

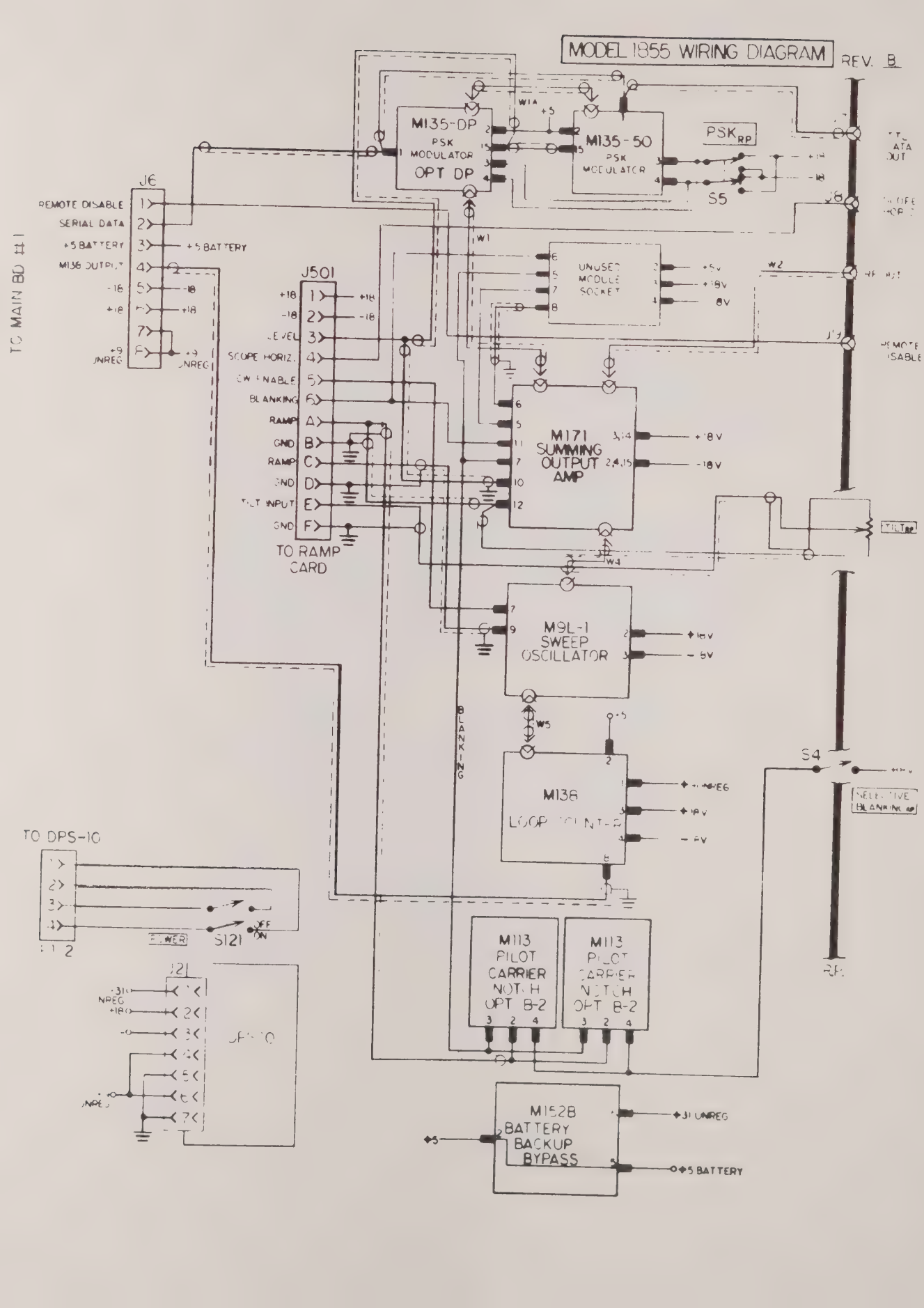
Card Reader Board Schematic

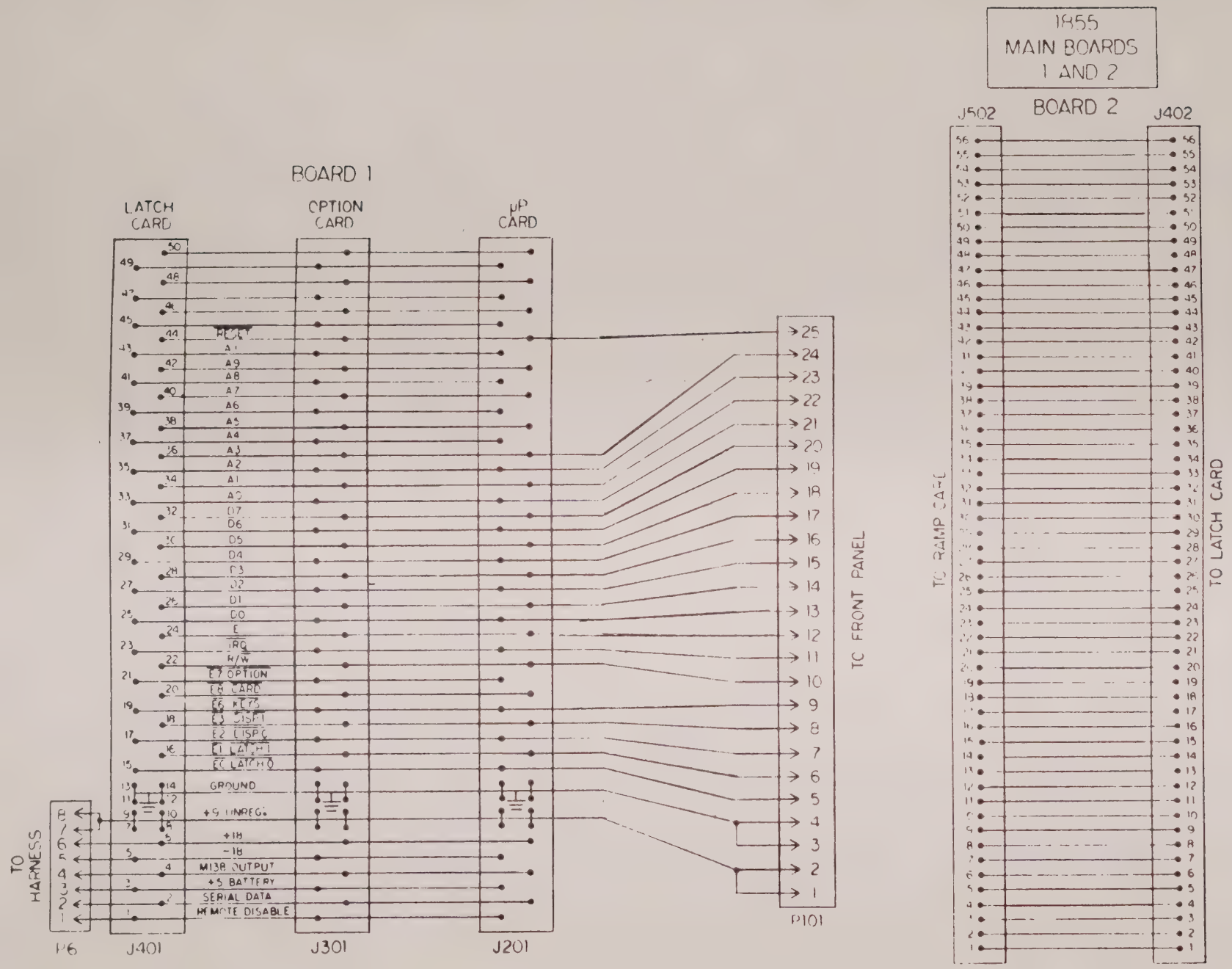
ME-1 PC Layout

ME-1 PC Schematic

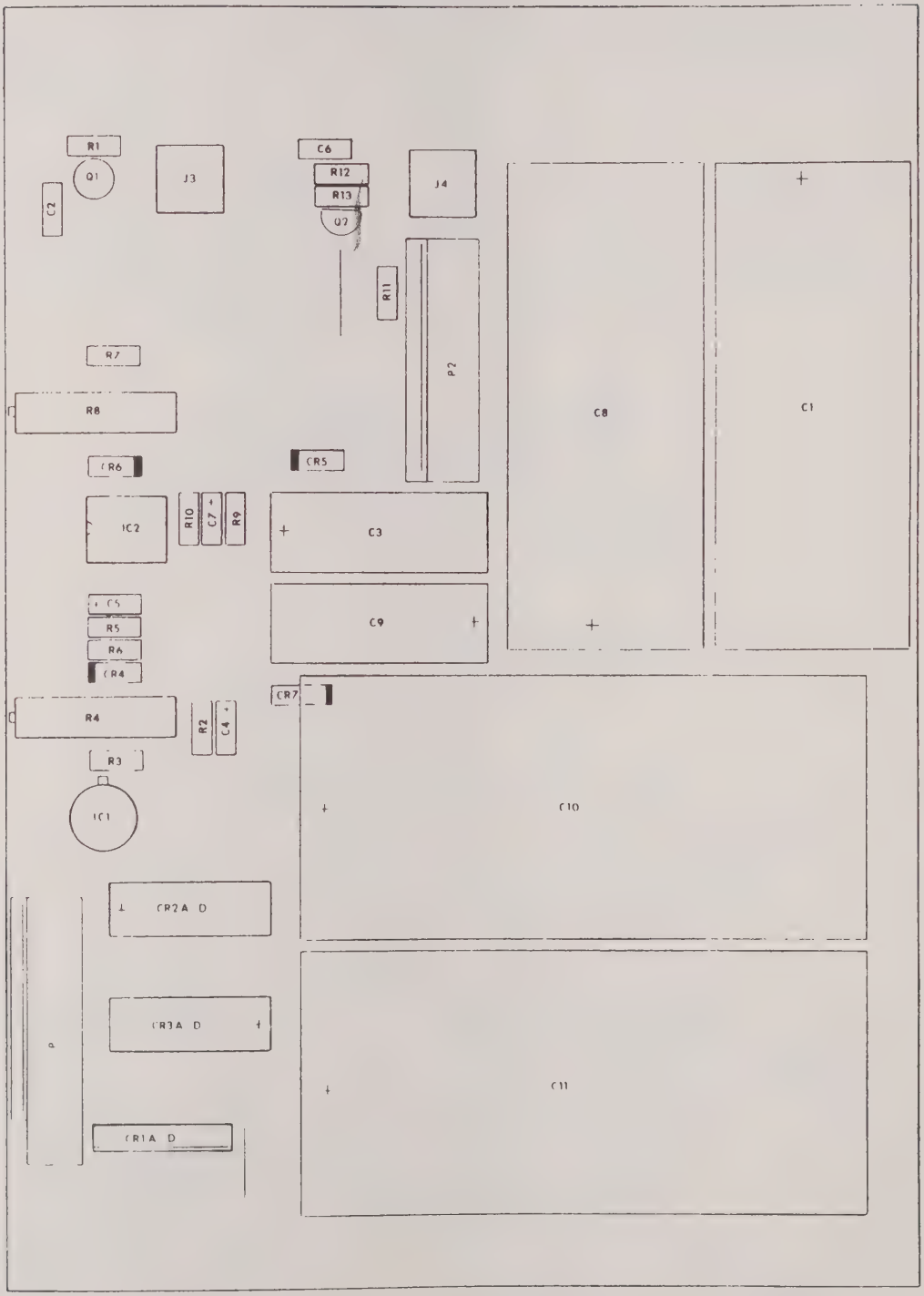

DPS10
POWER SUPPLY
BOARD
M138
M113 OPTION)
M135-SD
M135-DP
M152B
M171
MPL 1
RAMP CARD
ORANGE)
LATCH CARD
RED)
OPTION
MICROPROCESSOR
CARD (BLACK)
FRONT PANEL
BOARD



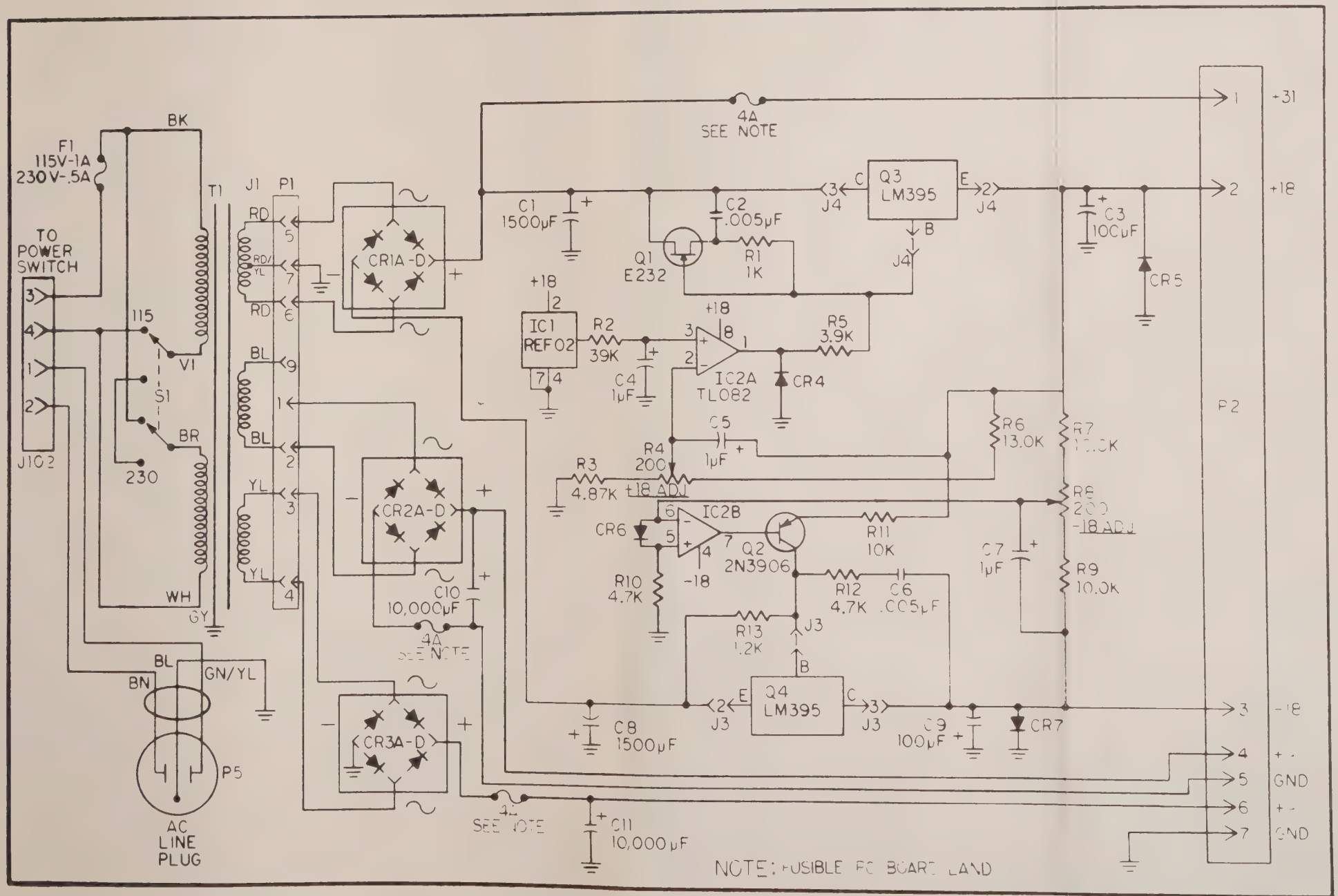

MODEL 1855 WIRING DIAGRAM
REV. B
TO MAIN BD #1
J6
REMOTE DISABLE
SERIAL DATA
+5 BATTERY
+5 BATTERY
-18
+18
+9 UNREG
+9 UNREG
J501
+18
-18
LEVEL
SCOPE HORIZ.
CW ENABLE
BLANKING
RAMP
GND
RAMP
GND
TILT INPUT
GND
TO RAMP CARD
M135-DP
PSK MODULATOR
OPT DP
M135-50
PSK MODULATOR
PSK RP
S5
UNUSED MODULE SOCKET
+5V
+18V
-8V
M171
SUMMING OUTPUT AMP
+18V
-18V
M9L-1
SWEEP OSCILLATOR
+18V
-8V
M138
+UNREG
+18V
-8V
BLANKING
TILT RP
S4
SELECTIVE BLANKING
TO DPS-10
POWER
S121
OFF
ON
J21
+31 UNREG
+18
-8
UNREG
M113
PILOT CARRIER NOTCH
OPT B-2
M113
PILOT CARRIER NOTCH
OPT B-2
M152B
BATTERY BACKUP BYPASS
+31 UNREG
+5 BATTERY
+5


1855
MAIN BOARDS
1 AND 2
BOARD 1
LATCH CARD
OPTION CARD
µP CARD
BOARD 2
J502
J402
TO RAMP CARD
TO LATCH CARD
TO FRONT PANEL
TO HARNESS
GROUND
+5 UNREG.
+18
-18
M13B OUTPUT
+5 BATTERY
SERIAL DATA
REMOTE DISABLE
P6
J401
J301
J201
P101

DPS 10


R1
Q1
J3
C2
C6
R12
R13
Q2
J4
R11
P2
C8
C1
R7
R8
CR6
CR5
IC2
R10
C7
R9
C3
C5
R5
R6
CR4
C9
CR7
R4
R2
C4
R3
IC1
C10
CR2A D
CR3A D
CR1A D
C11

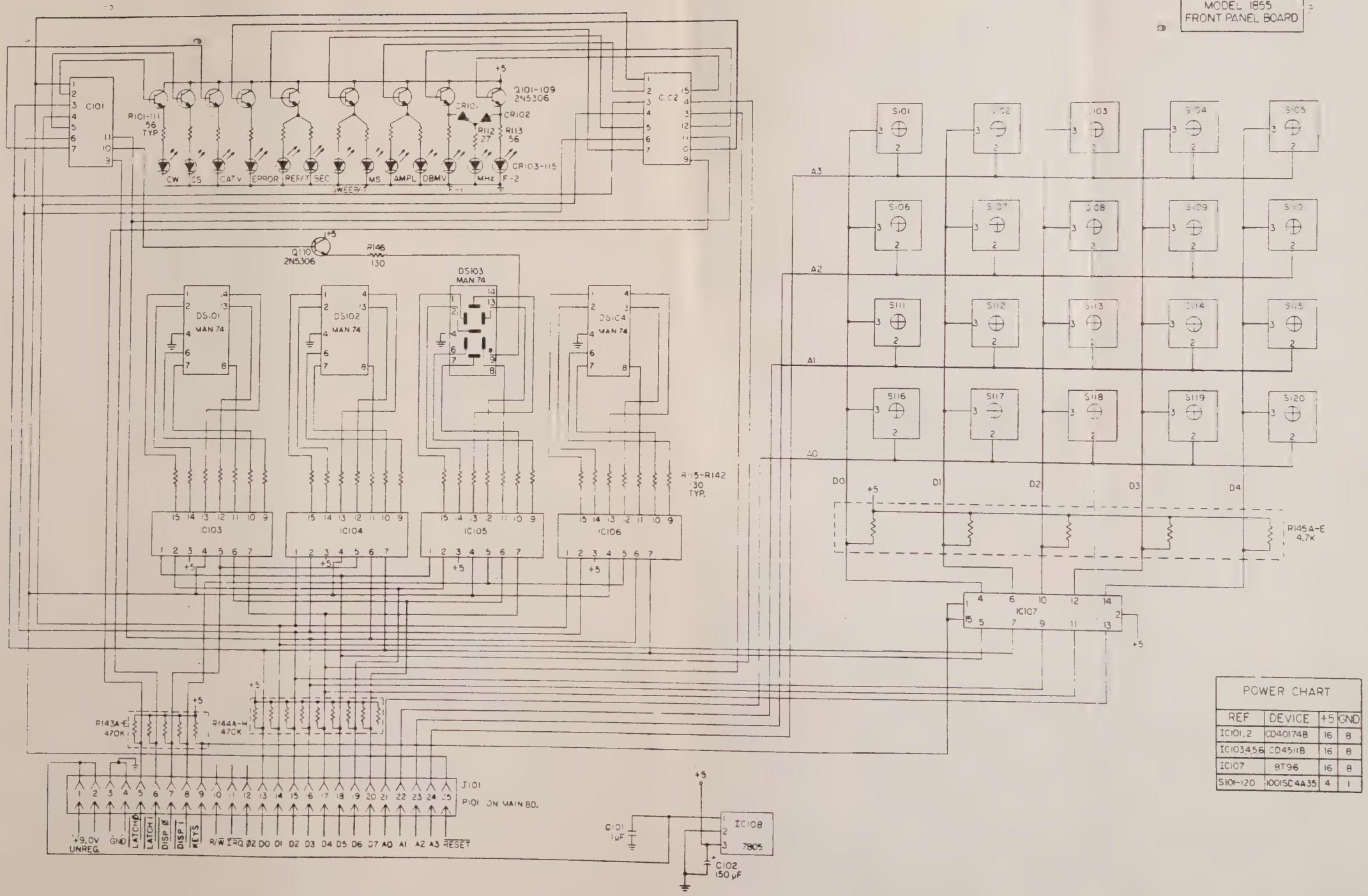
DPS 10
POWER SUPPLY



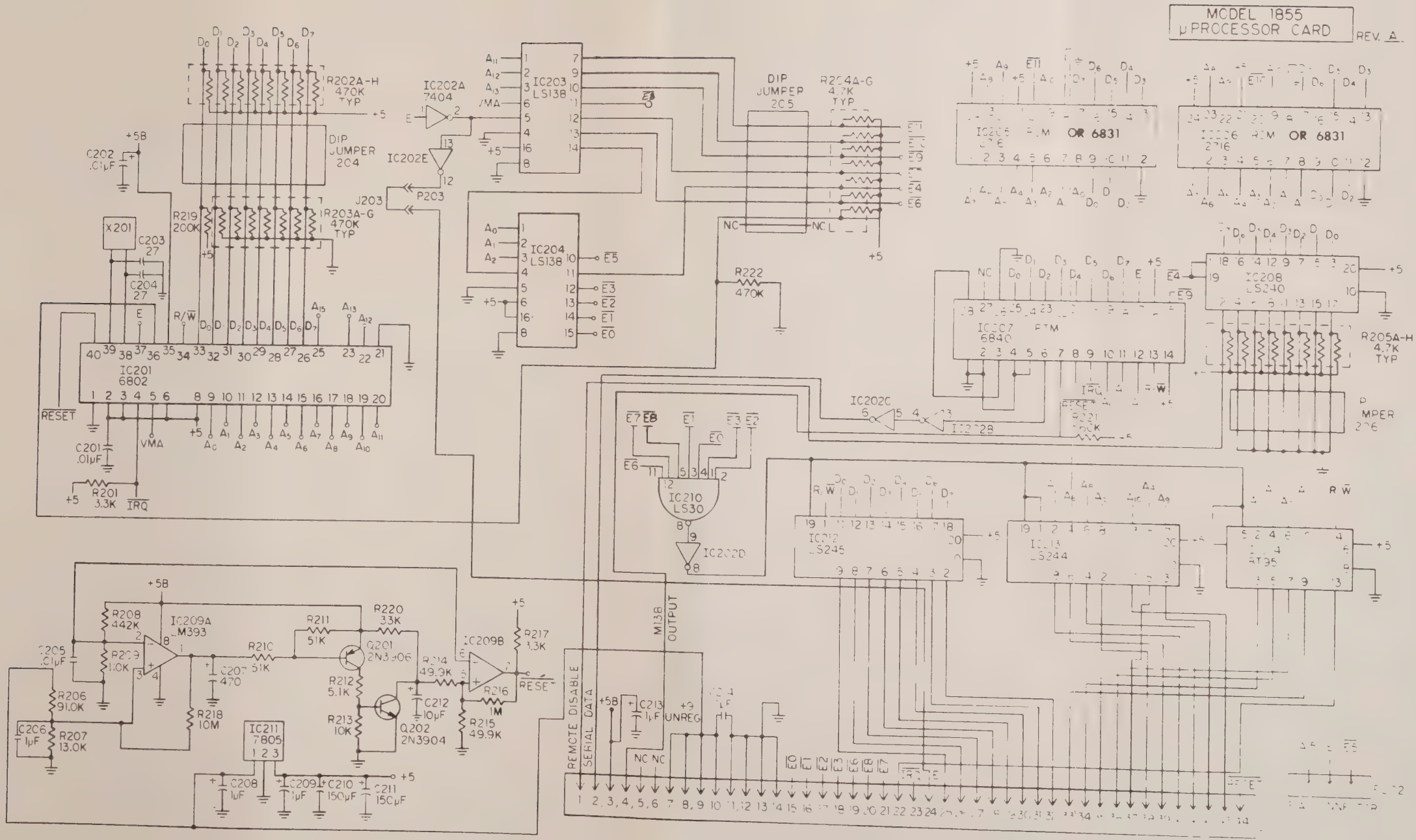
REVISIONS		
	ECN'S	BY

WAVETEK INDIANA

MODEL 1855
FRONT PANEL BOARD

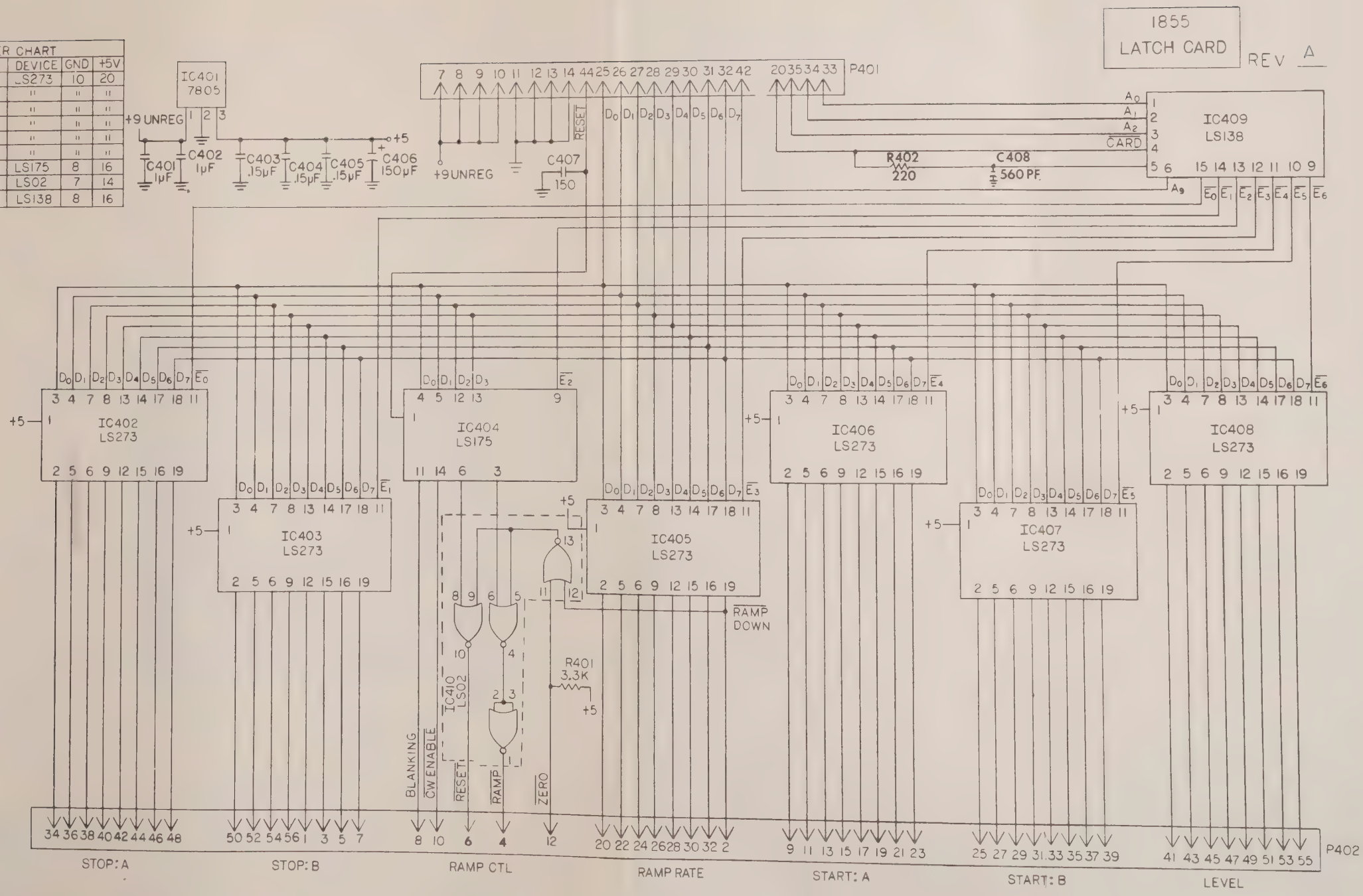


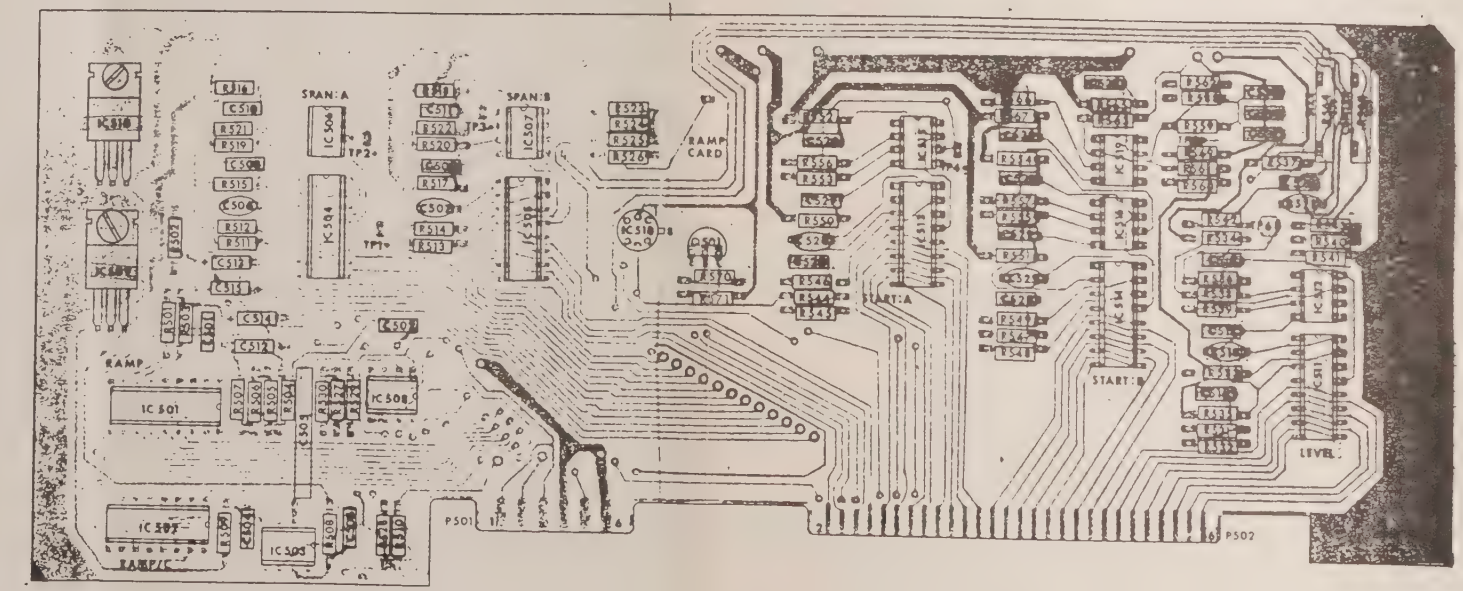
POWER CHART			
REF	DEVICE	+5	GND
IC101,2	CD4017AB	16	8
IC103,4,5,6	CD4511B	16	8
IC107	8T96	16	8
S101-120	1001SC4A35	4	1


MODEL 1855
μPROCESSOR CARD
REV. A
IC201 6802
IC202A 7404
IC202E
IC202C
IC202D
IC203 LS138
IC204 LS138
IC205 RAM OR 6831
IC206 ROM OR 6831
IC207 PIA 6840
IC208 LS240
IC209A LM393
IC209B
IC210 LS30
IC211 7805
IC212 LS245
IC213 LS244
R202A-H 470K TYP
R203A-G 470K TYP
R204A-G 4.7K TYP
R205A-H 4.7K TYP
DIP JUMPER 204
DIP JUMPER 205
DIP JUMPER 206
R201 3.3K
R207 13.0K
R208 442K
R209 1.0K
R210 51K
R211 51K
R212 5.1K
R213 10K
R214 49.9K
R215 49.9K
R216 1M
R217 3.3K
R218 10M
R219 200K
R220 33K
R221 10K
R222 470K
C201 .01μF
C202 .01μF
C203 27
C204 27
C205 .01μF
C206 1μF
C207 470
C208 1μF
C209 1μF
C210 150μF
C211 150μF
C212 10μF
C213 1μF
Q201 2N3906
Q202 2N3904
X201
P203
J203
M138 OUTPUT
REMOTE DISABLE
SERIAL DATA
UNREG
RESET
IRQ
VMA

1855 LATCH CARD REV A

POWER CHART			
IC-	DEVICE	GND	+5V
402	LS273	10	20
403	"	"	"
405	"	"	"
406	"	"	"
407	"	"	"
408	"	"	"
404	LS175	8	16
410	LS02	7	14
409	LS138	8	16





QTY #1 QD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLES

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO

APPROVALS	DATE
Drawn W. PERSON	1-12-[illegible]
Checked	

WAVETEK

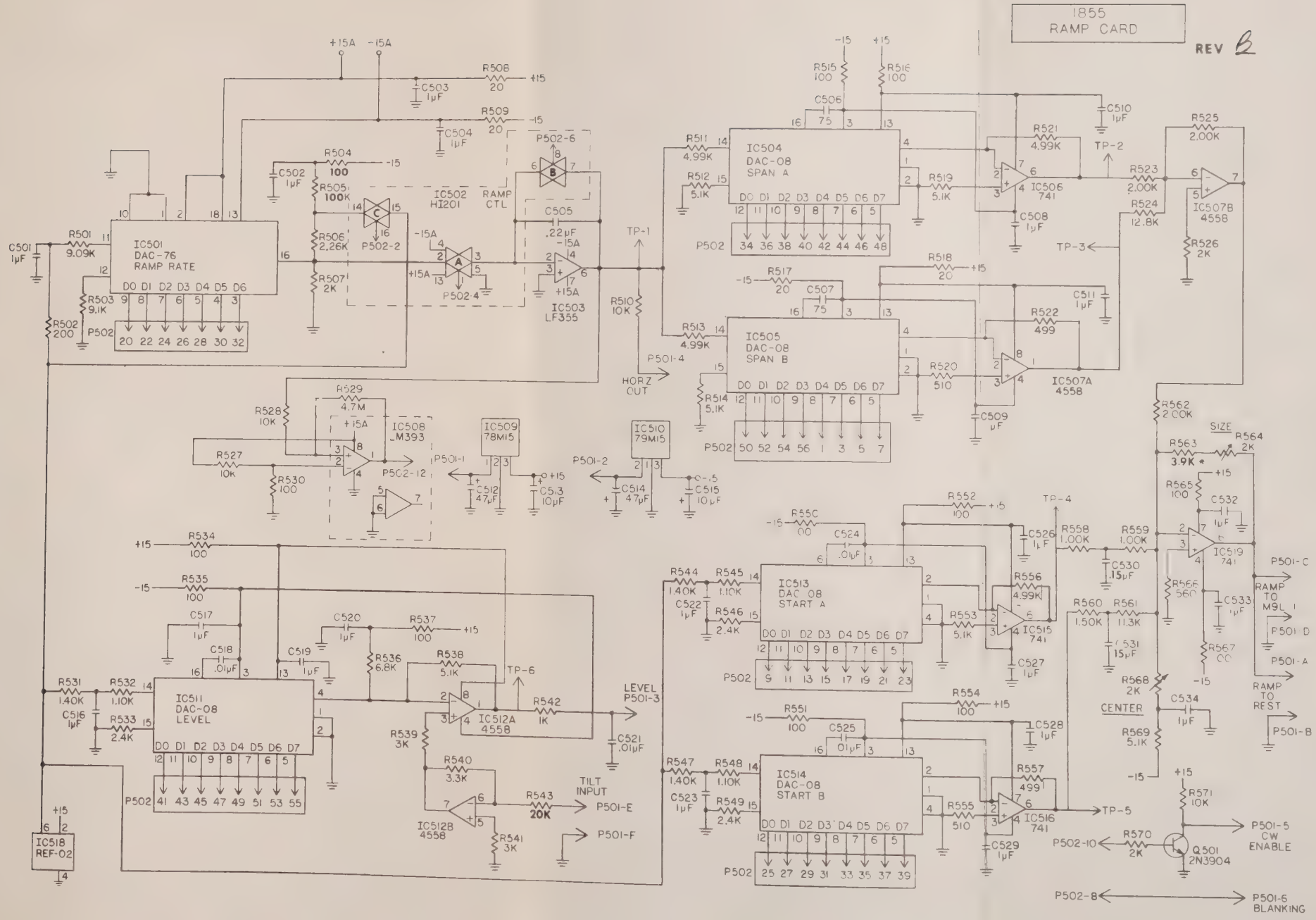
ASSEMBLY DRAWING
1855 RAMP CARD

SIZE	CODE IDENT NO	DRAWING NO
D	34280	04125.30[illegible]0085

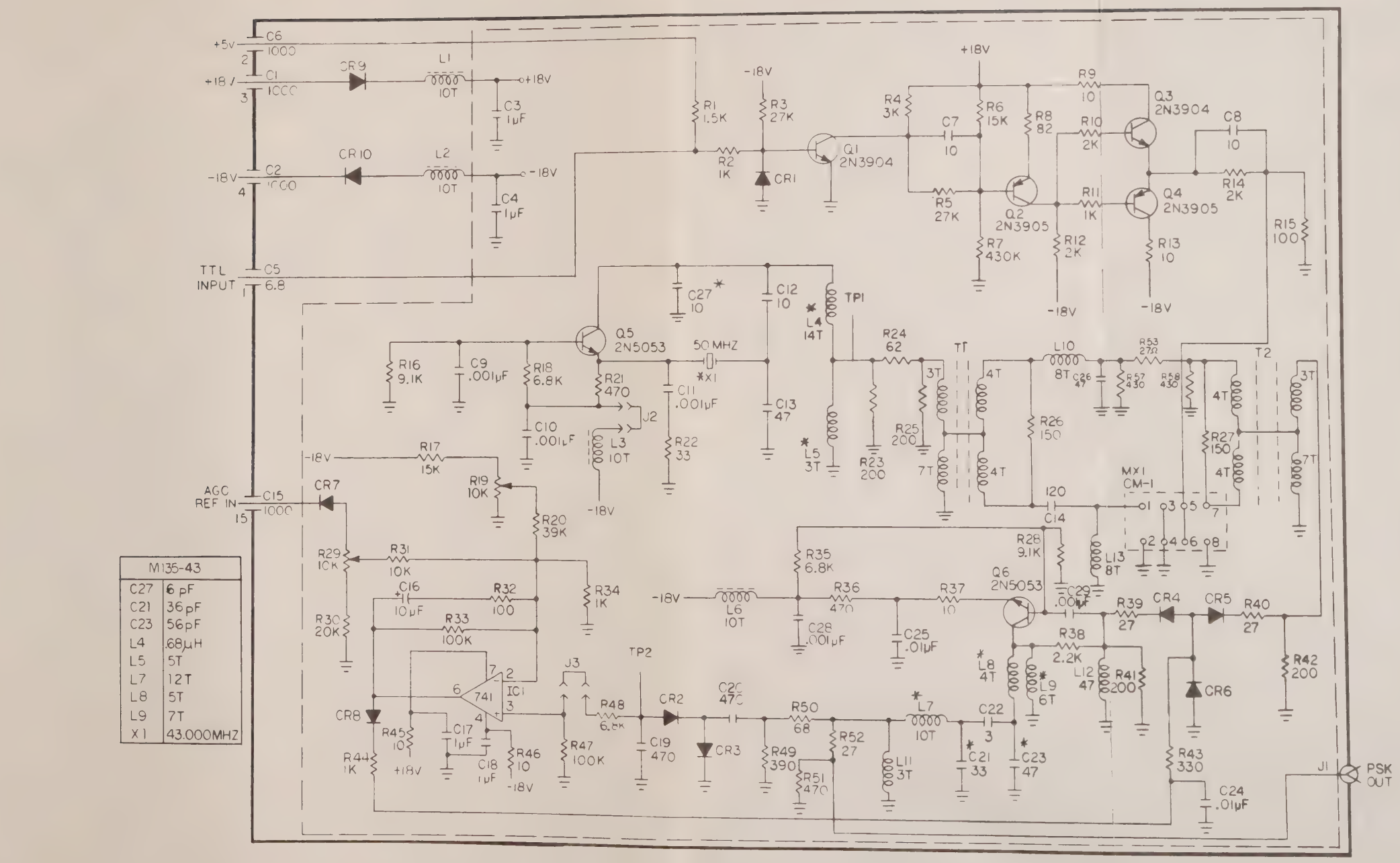
SCALE 2:1

NEXT ASSY | USED ON

APPLICATION

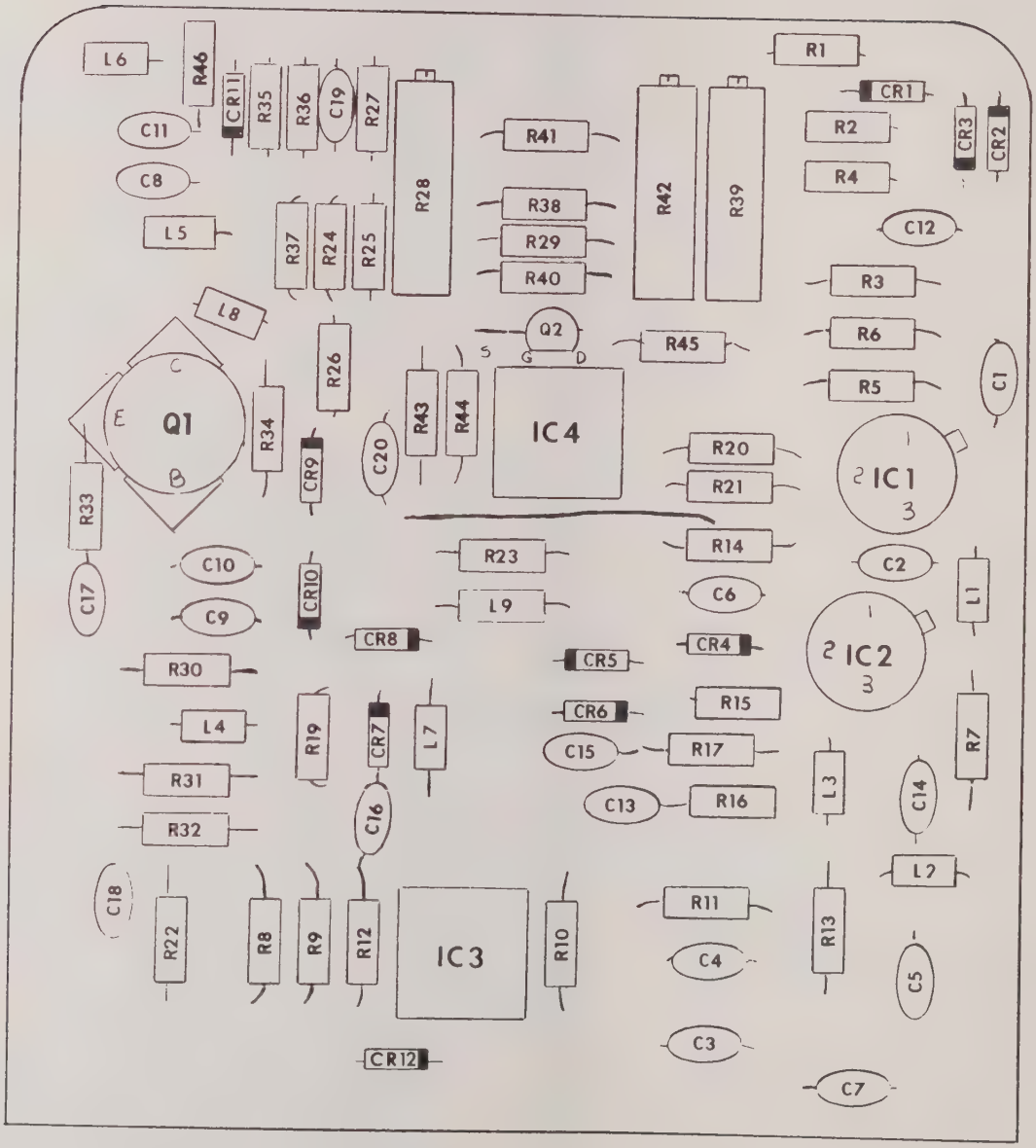

1855
RAMP CARD
REV B
IC501
DAC-76
RAMP RATE
IC502
HI201
RAMP
CTL
IC503
LF355
IC504
DAC-08
SPAN A
IC505
DAC-08
SPAN B
IC506
741
IC507A
4558
IC507B
4558
IC508
M393
IC509
78M15
IC510
79M15
IC511
DAC-08
LEVEL
IC512A
4558
IC512B
4558
IC513
DAC-08
START A
IC514
DAC-08
START B
IC515
741
IC516
741
IC518
REF-02
IC519
741
Q501
2N3904
TP-1
TP-2
TP-3
TP-4
TP-5
TP-6
HORZ
OUT
SIZE
CENTER
RAMP
TO
M9L
RAMP
TO
REST
TILT
INPUT
20K
P501-1
P501-2
P501-4
P501-A
P501-B
P501-C
P501-D
P501-E
P501-F
P501-5
CW
ENABLE
P501-6
BLANKING
P502-2
P502-4
P502-6
P502-8
P502-10
P502
LEVEL
P501-3

PSK MODULATOR
M135-50
REV A

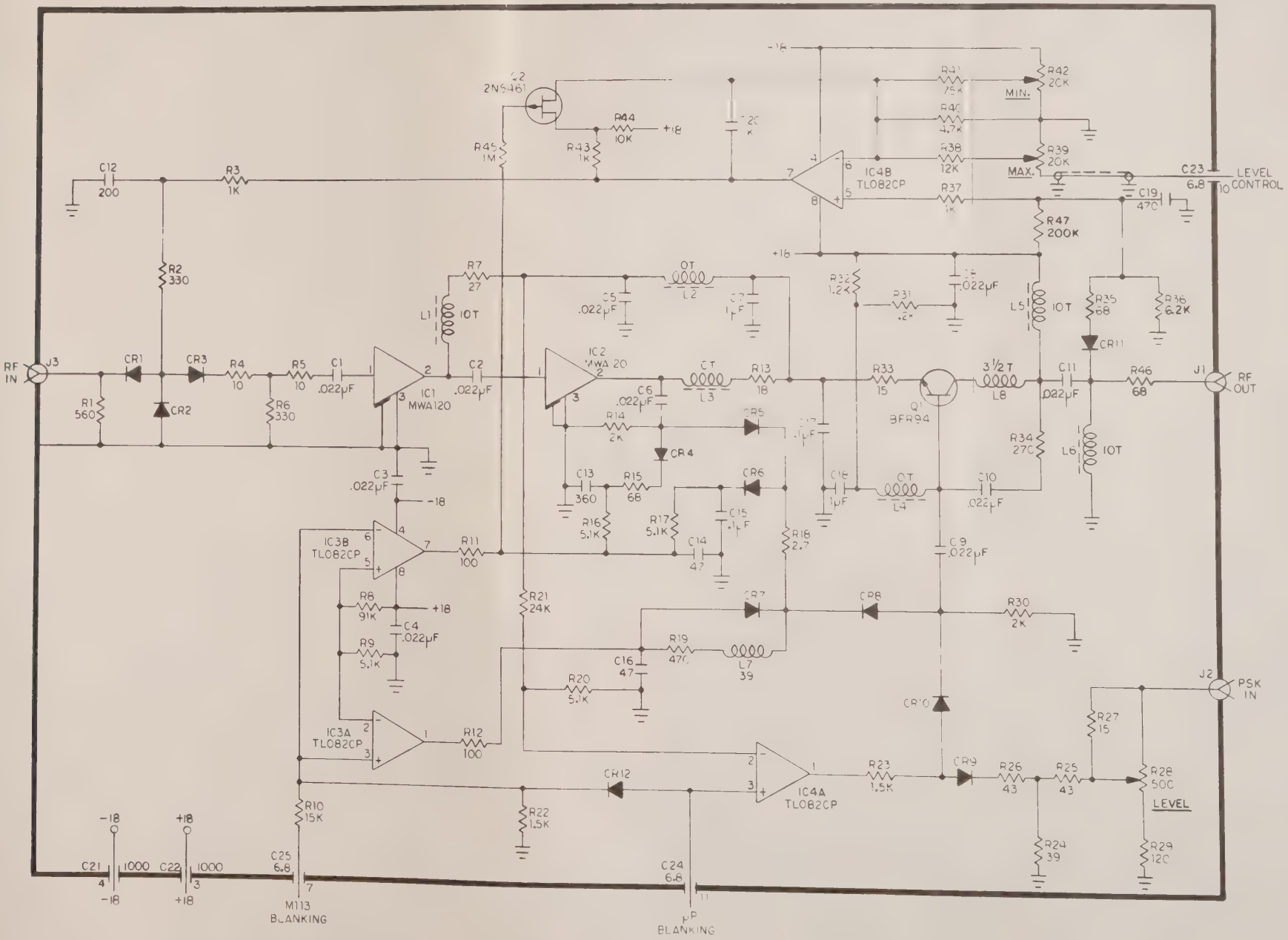


M135-43	
C27	6 pF
C21	36 pF
C23	56 pF
L4	.68µH
L5	5T
L7	12T
L8	5T
L9	7T
X1	43.000MHZ

M171

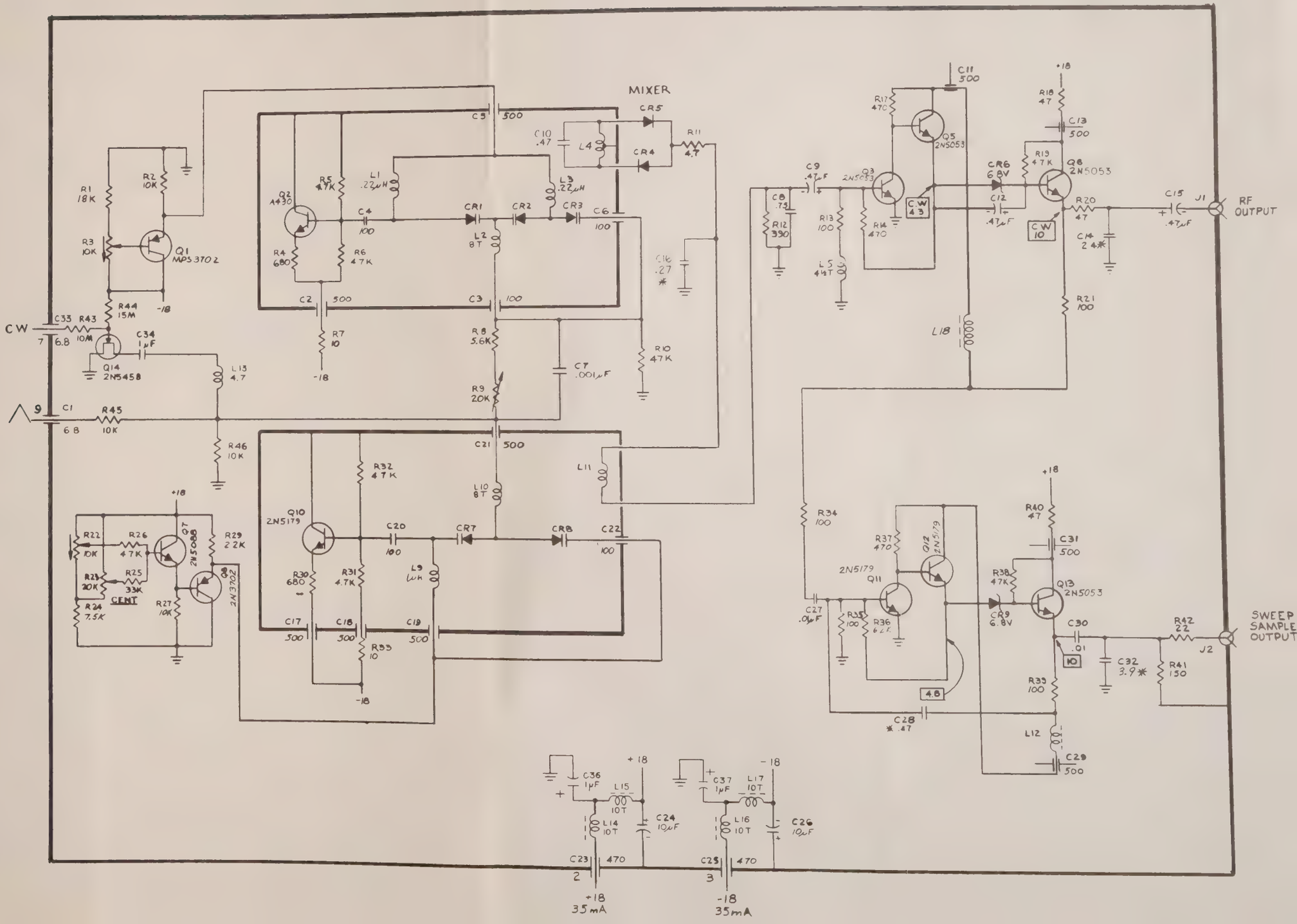

L6
R46
CR11
R35
R36
C19
R27
R28
R41
R42
R39
R1
CR1
R2
R4
CR3
CR2
C11
C8
L5
R37
R24
R25
R38
R29
R40
C12
R3
R6
R5
C1
L8
Q1
C
E
B
R34
R26
Q2
S
G
D
R45
R43
R44
IC4
C20
CR9
R33
C17
R20
R21
IC1
1
2
3
C10
C9
CR10
R23
L9
R14
C6
C2
L1
CR8
CR5
CR4
IC2
R30
L4
R19
CR7
L7
CR6
R15
C15
R17
R7
R31
C16
C13
R16
L3
C14
R32
L2
C18
R22
R8
R9
R12
IC3
R10
R11
C4
R13
C5
C3
CR12
C7

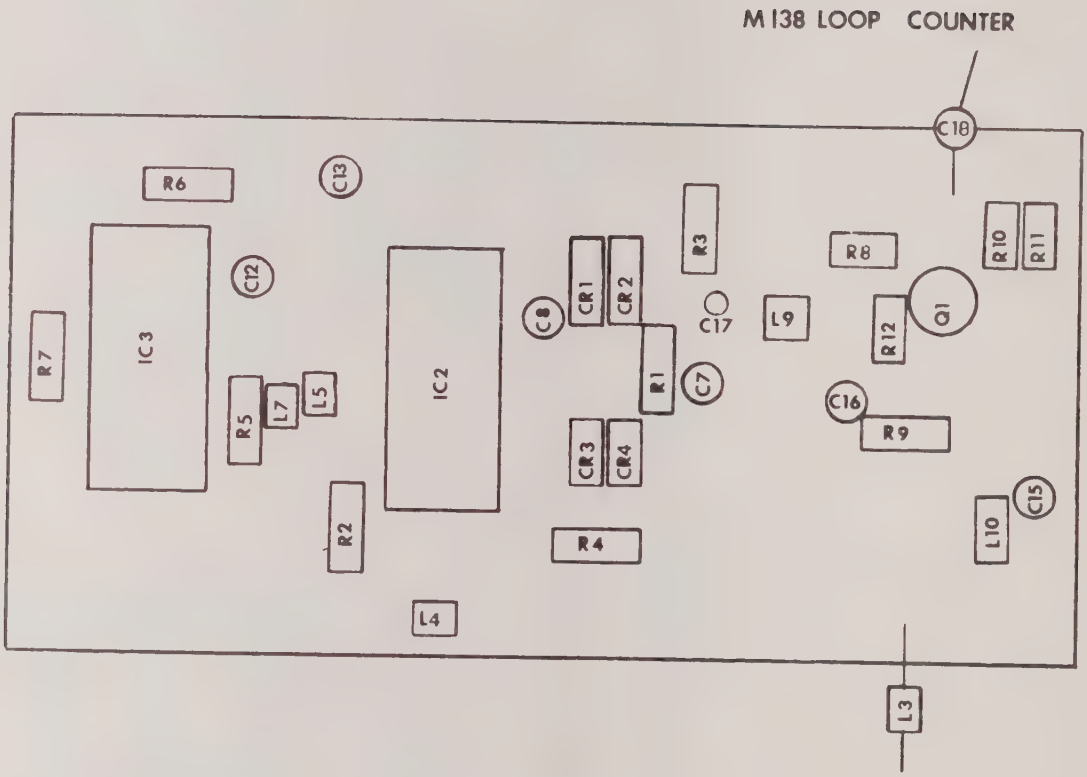
M171
SUMMING AMP
REV. C



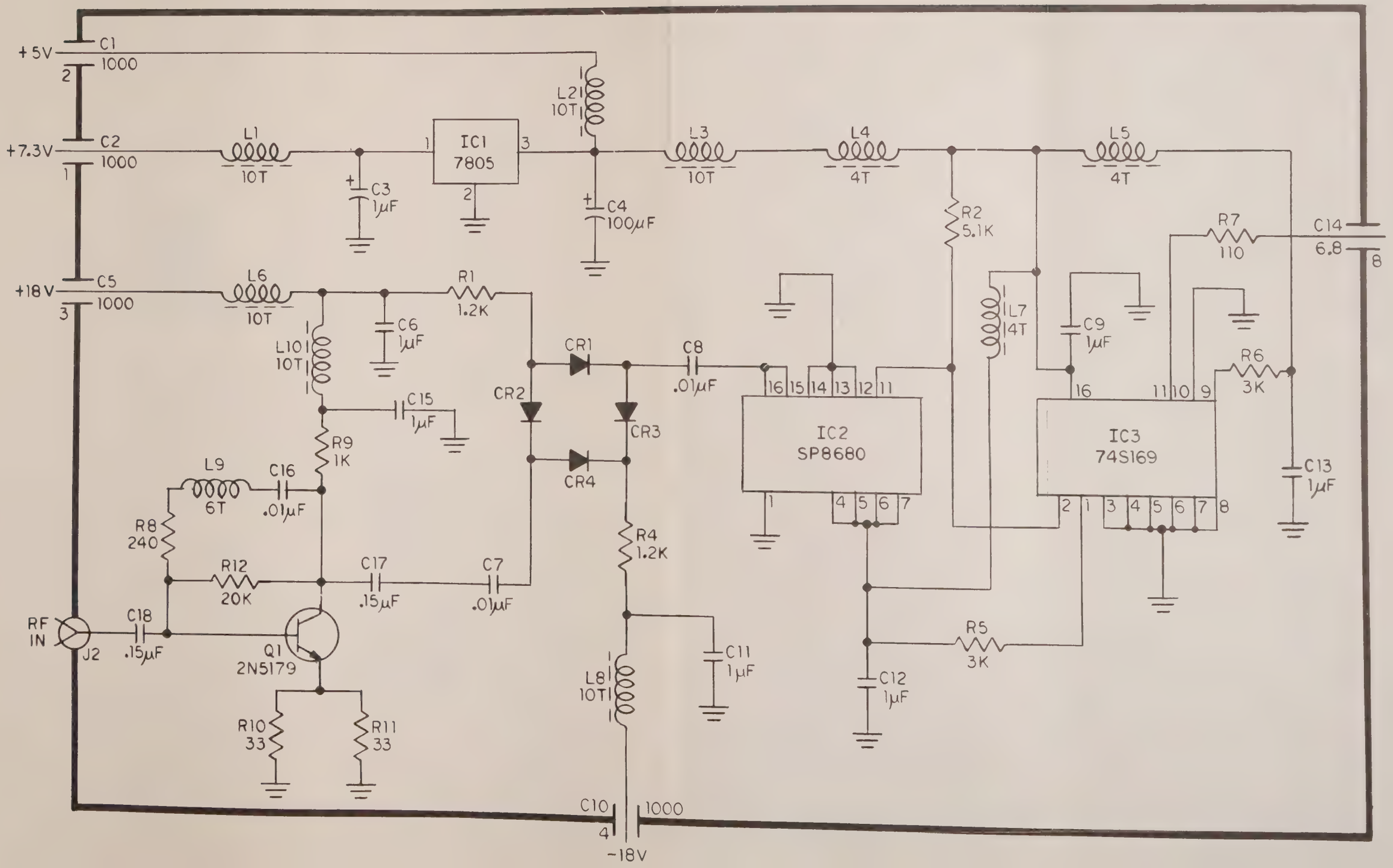
OSCILLATOR-MIXER
M9L-1

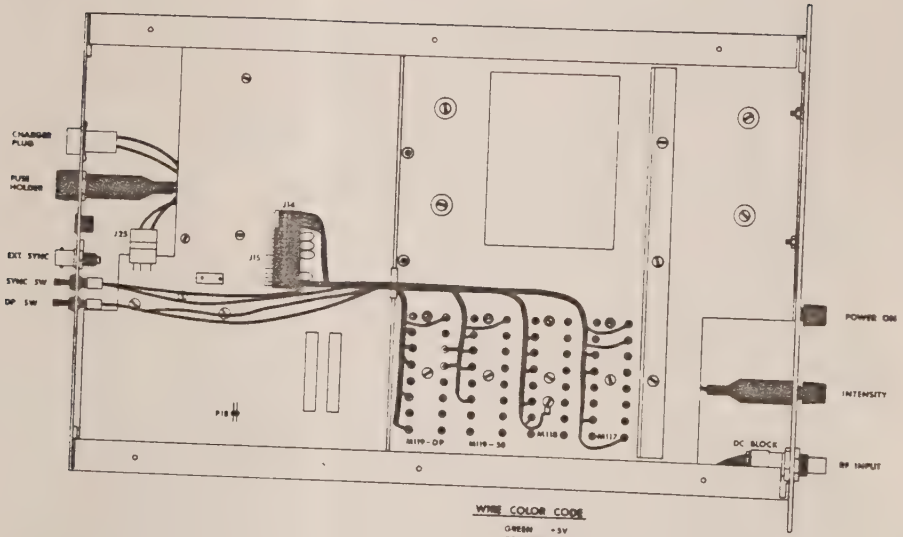
REV D




M138 LOOP COUNTER
C18
R6
C13
R3
R8
R10
R11
C12
IC3
IC2
CR1
CR2
C8
C17
L9
Q1
R12
R7
R1
C7
C16
R5
L7
L5
R9
CR3
CR4
C15
L10
R2
R4
L4
L3

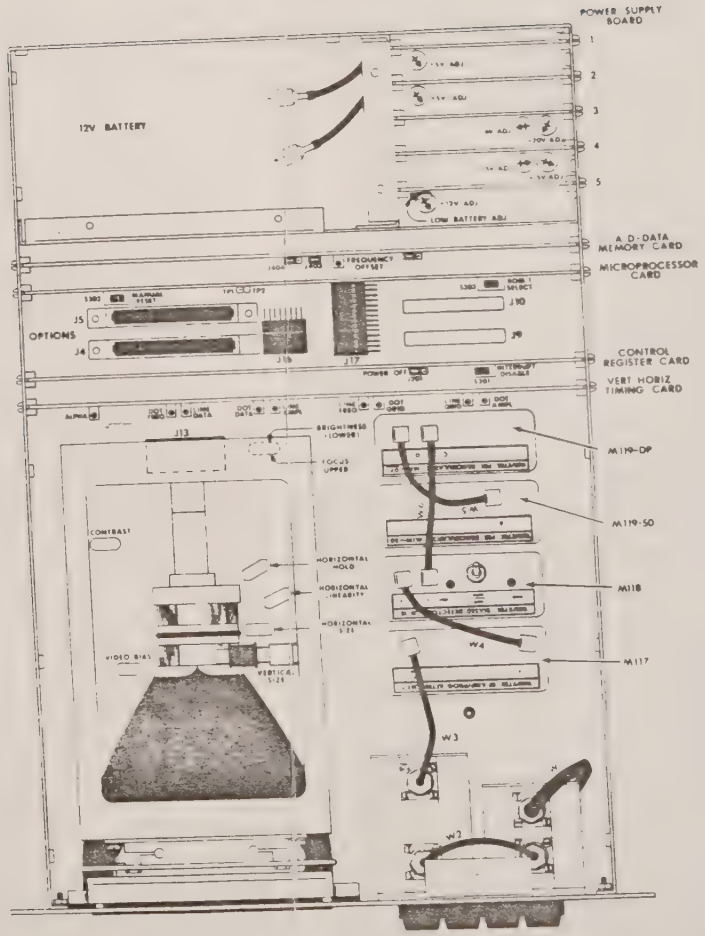
LOOP COUNTER
M138
REV B



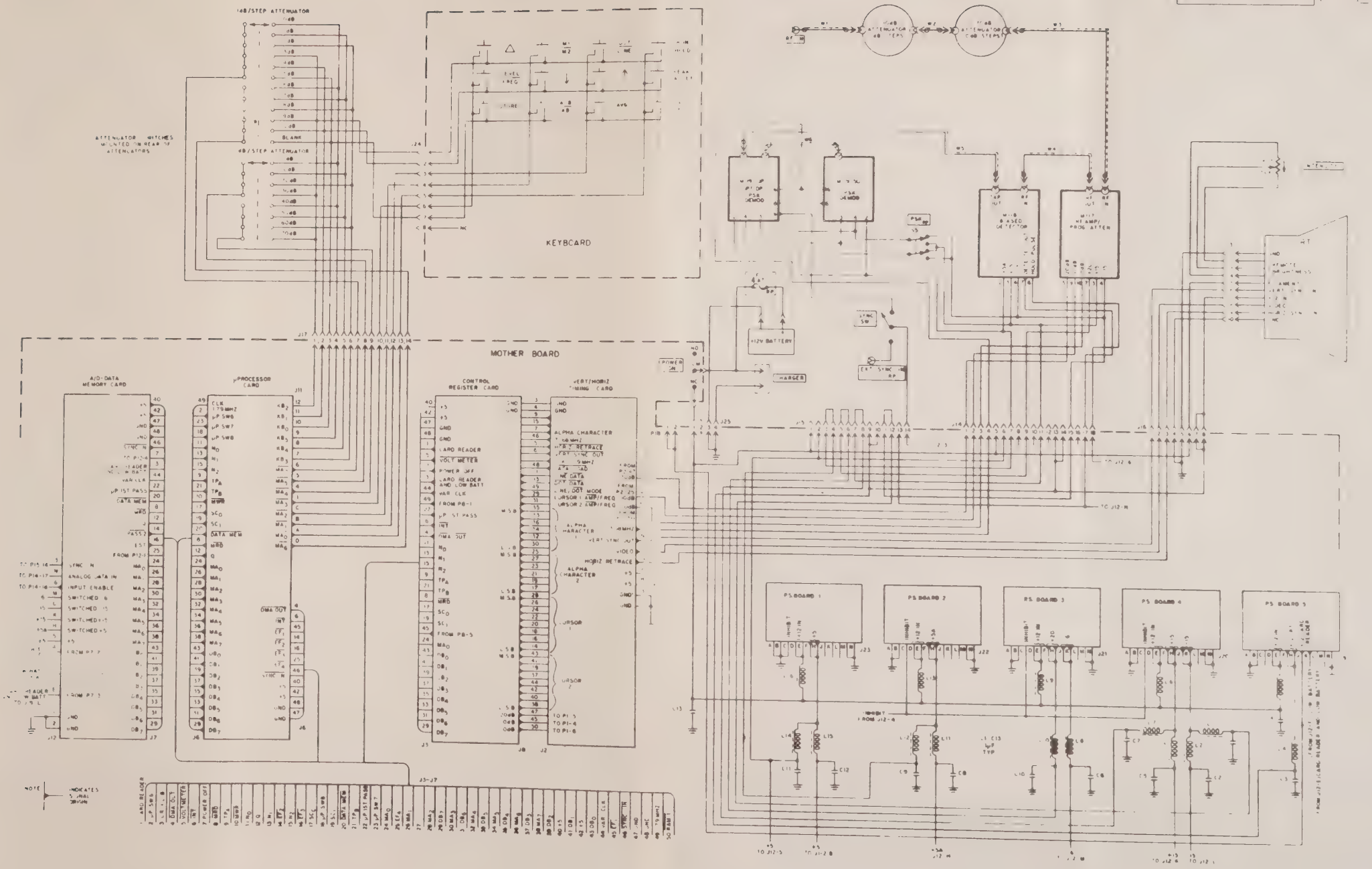


WIRE COLOR CODE

GREEN +5V
ORANGE +15V
YELLOW -15V

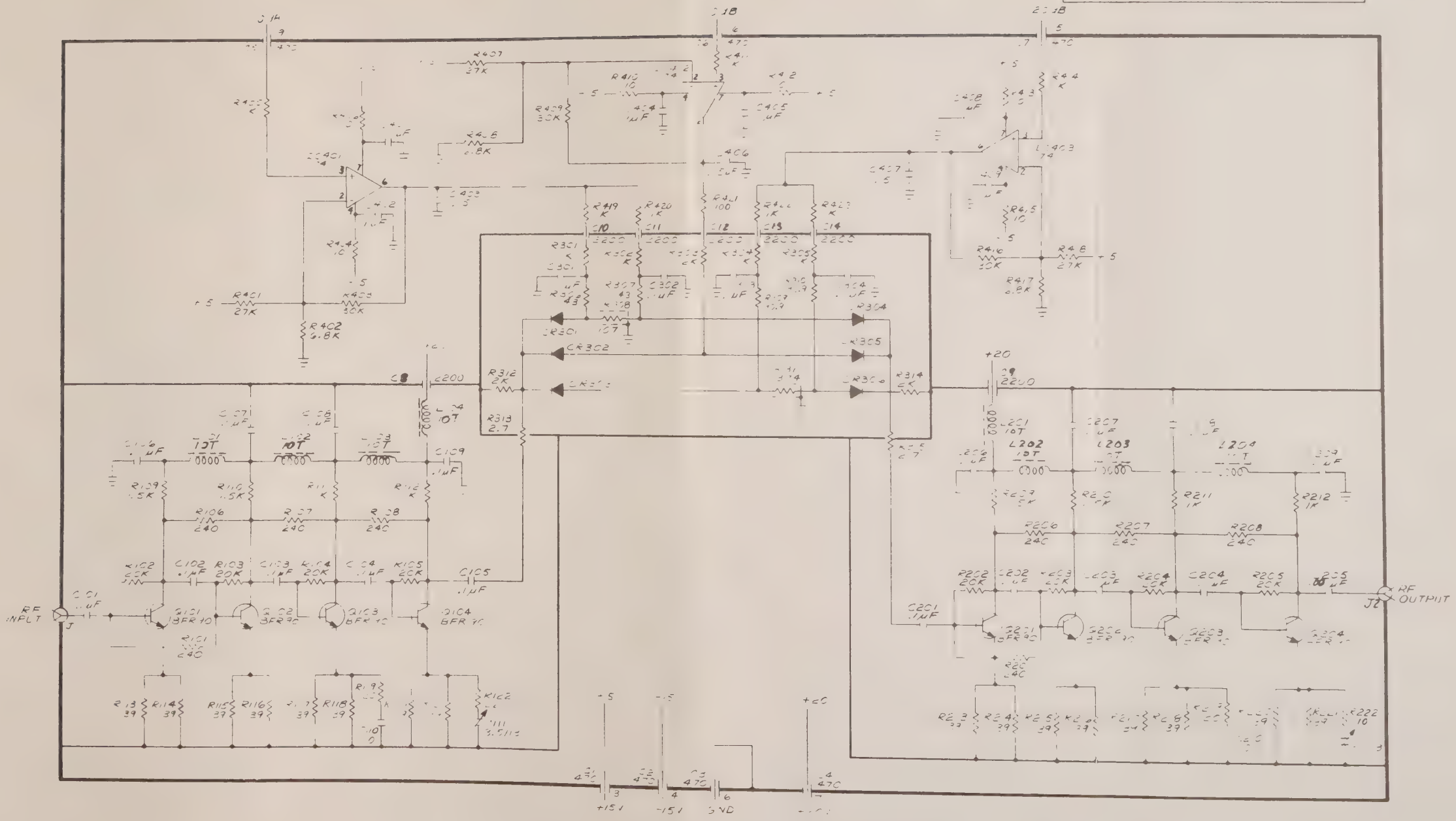


MODEL 1865
WIRING DIAGRAM



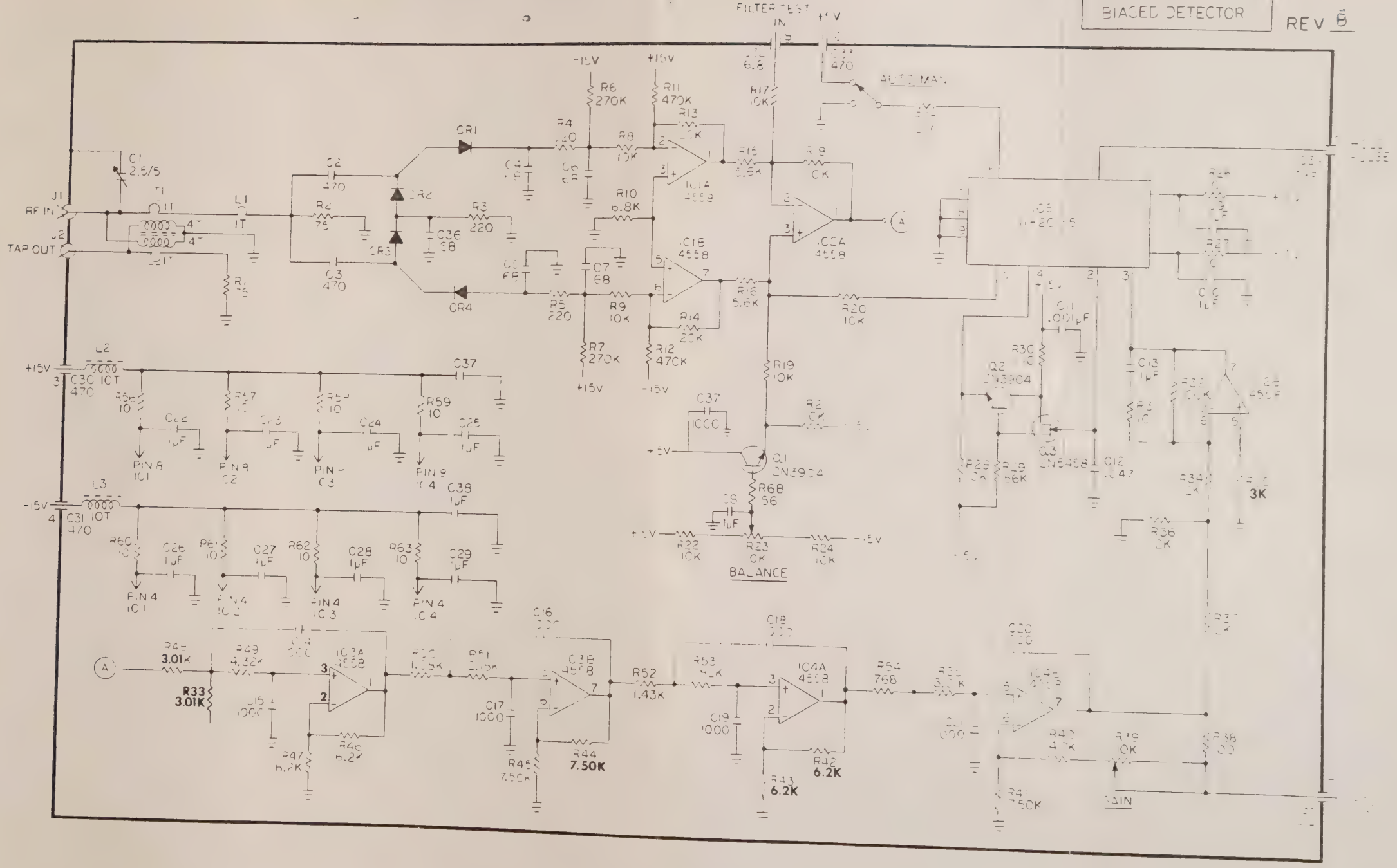
M117

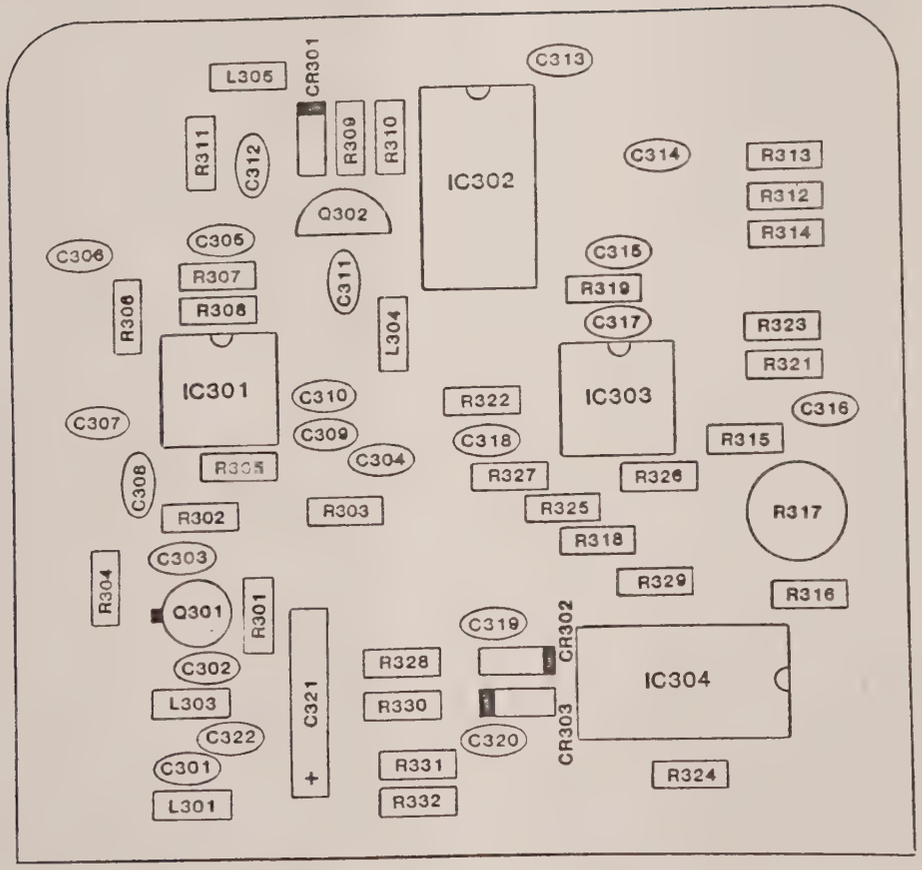
RF AMP PROGRAMMABLE ATTENUATOR

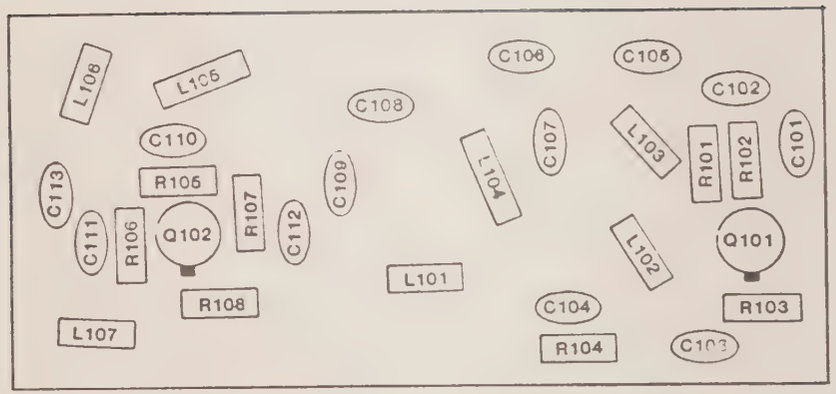


M118
BIASED DETECTOR

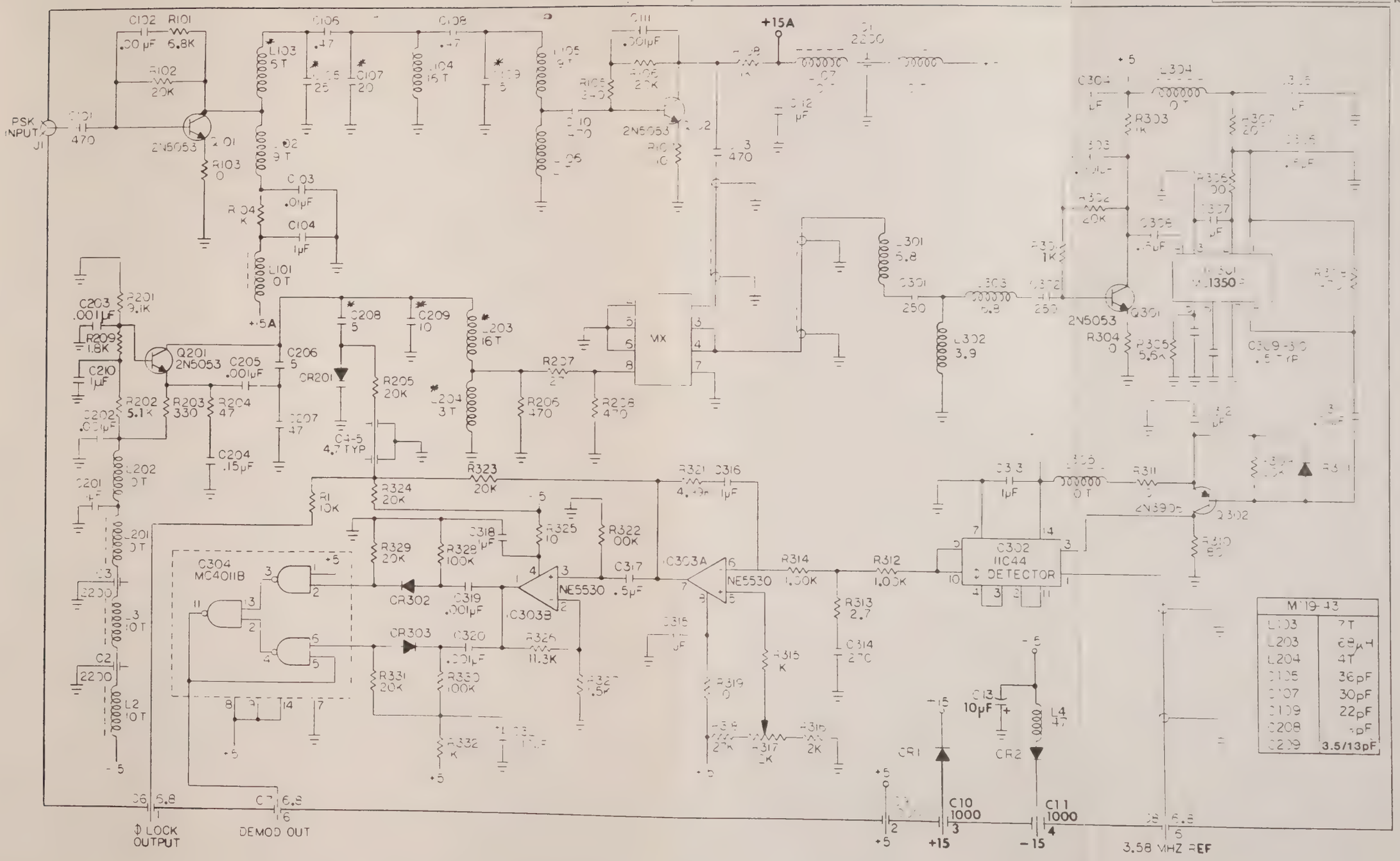
REV B



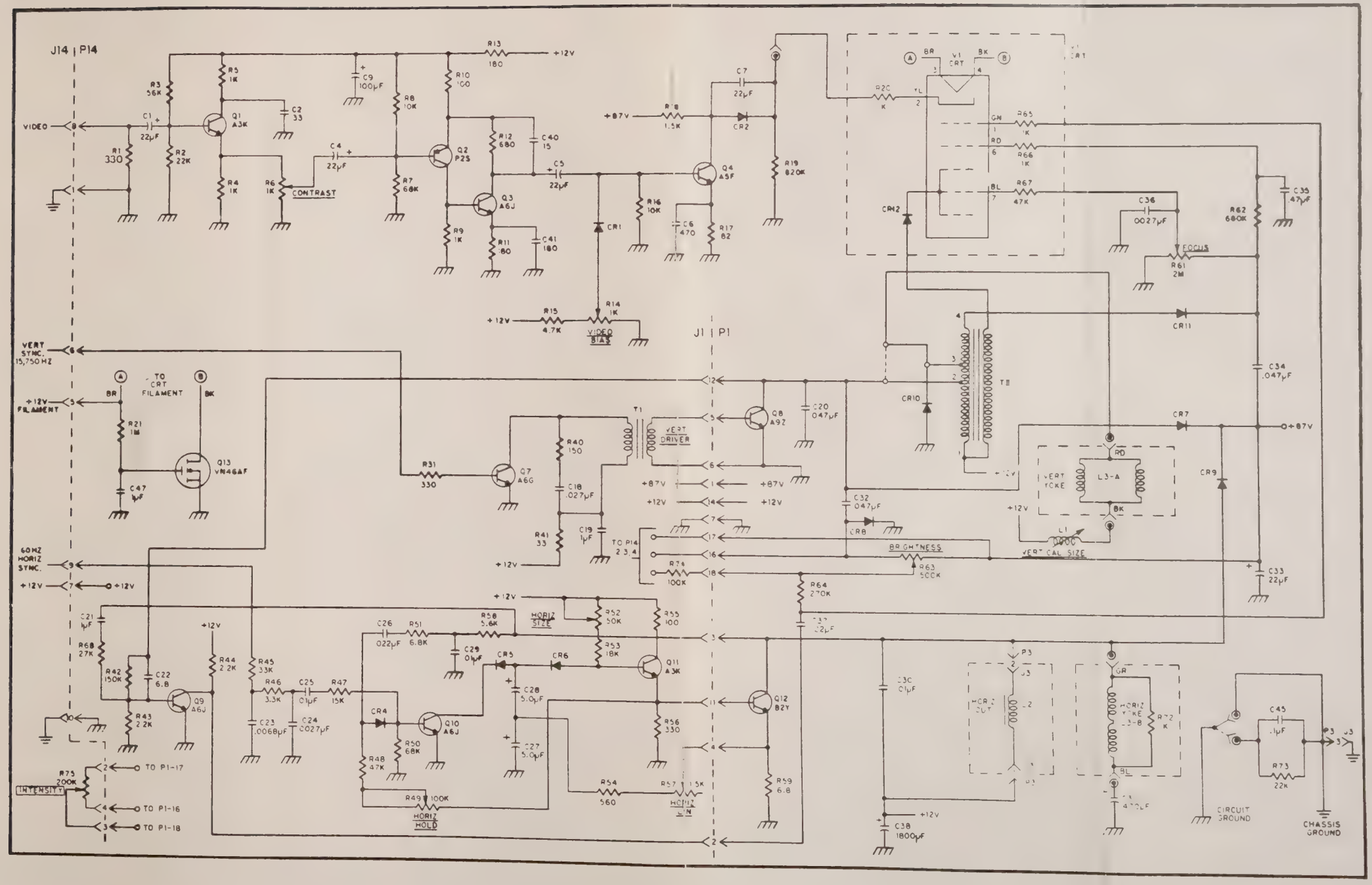




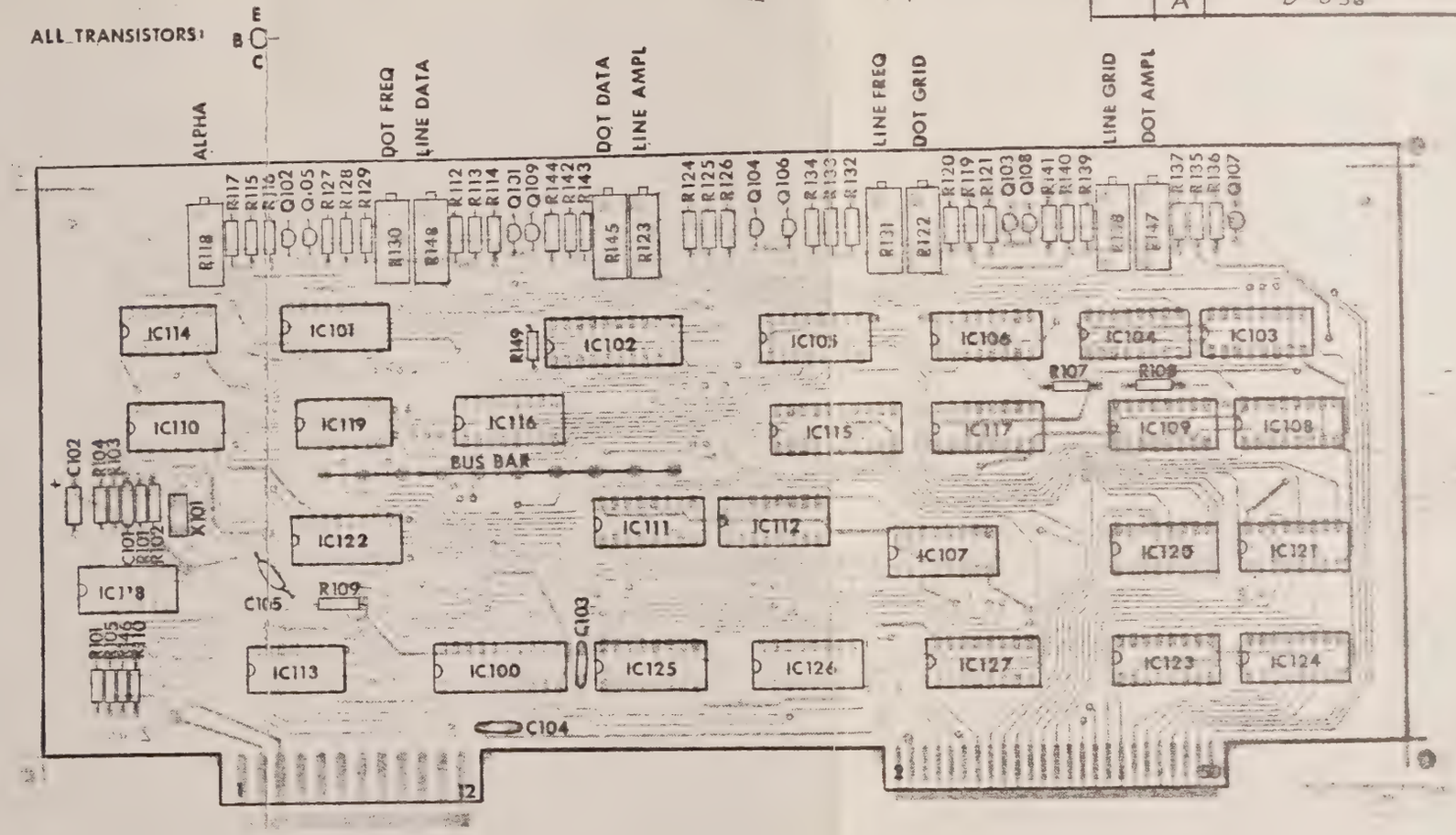
NOTE: C102 AND R101 ARE NOT USED ON M119-155


PSK INPUT J1
+15A
2N5053
MC4011B
NE5530
NE5530
1350
1350
1N4448
1N4448
1N4448

MODEL 1865
CRT ASSEMBLY
REV B



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	A	D-056	6-27-83	



		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:	CONTRACT NO.		WAVETEK INDIANA, INC
		FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ±	APPROVALS	DATE	TIMING CARD
		MATERIAL	DRAWN BOB ABLEL		
		FINISH	CHECKED		
NEXT ASSY	USED ON				SIZE B · CODE IDENT NO. 34280 · DRAWING NO. 0412-10-0002
APPLICATION		DO NOT SCALE DRAWING		6-27-83	SCALE · SHEET OF

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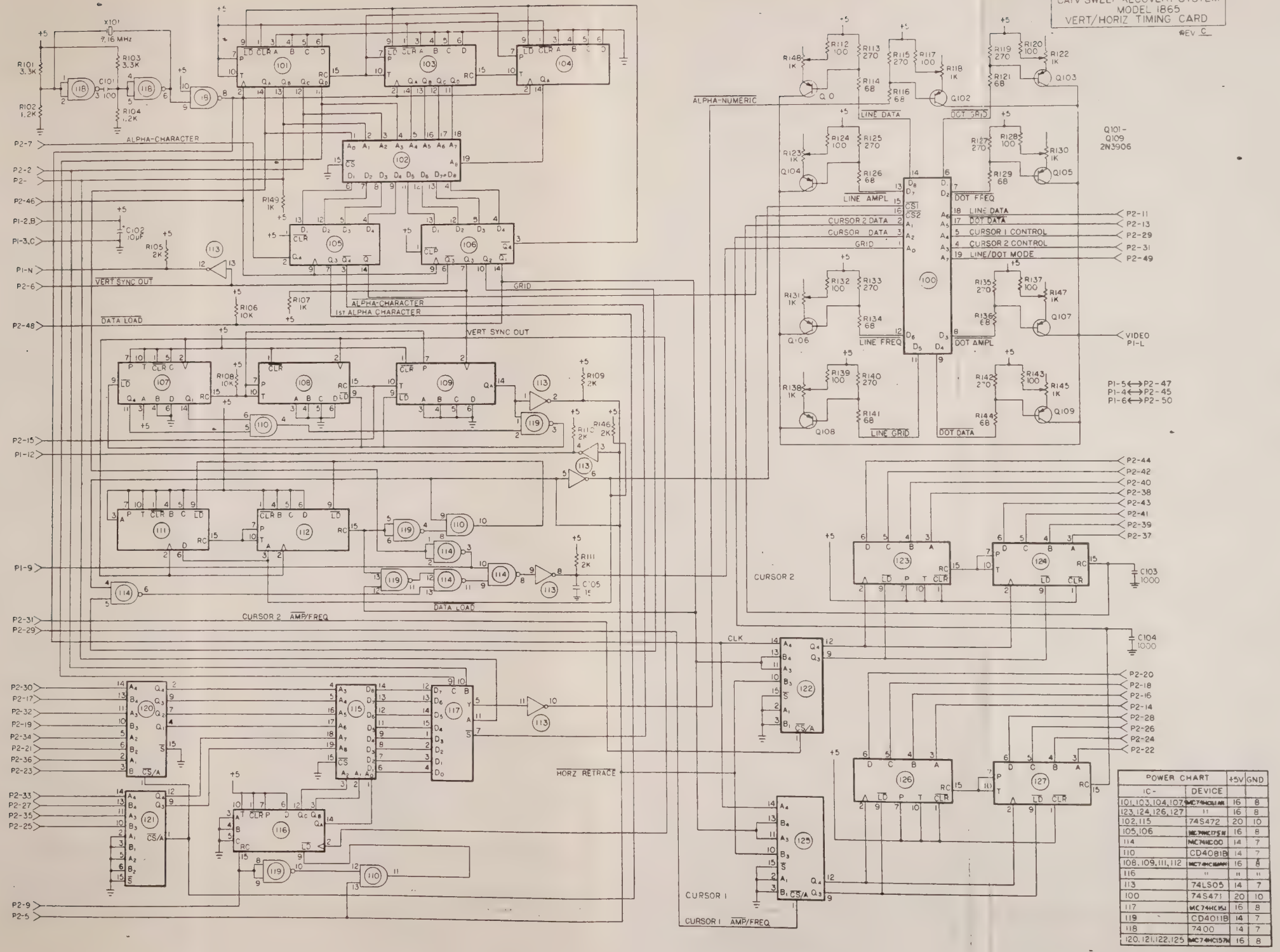
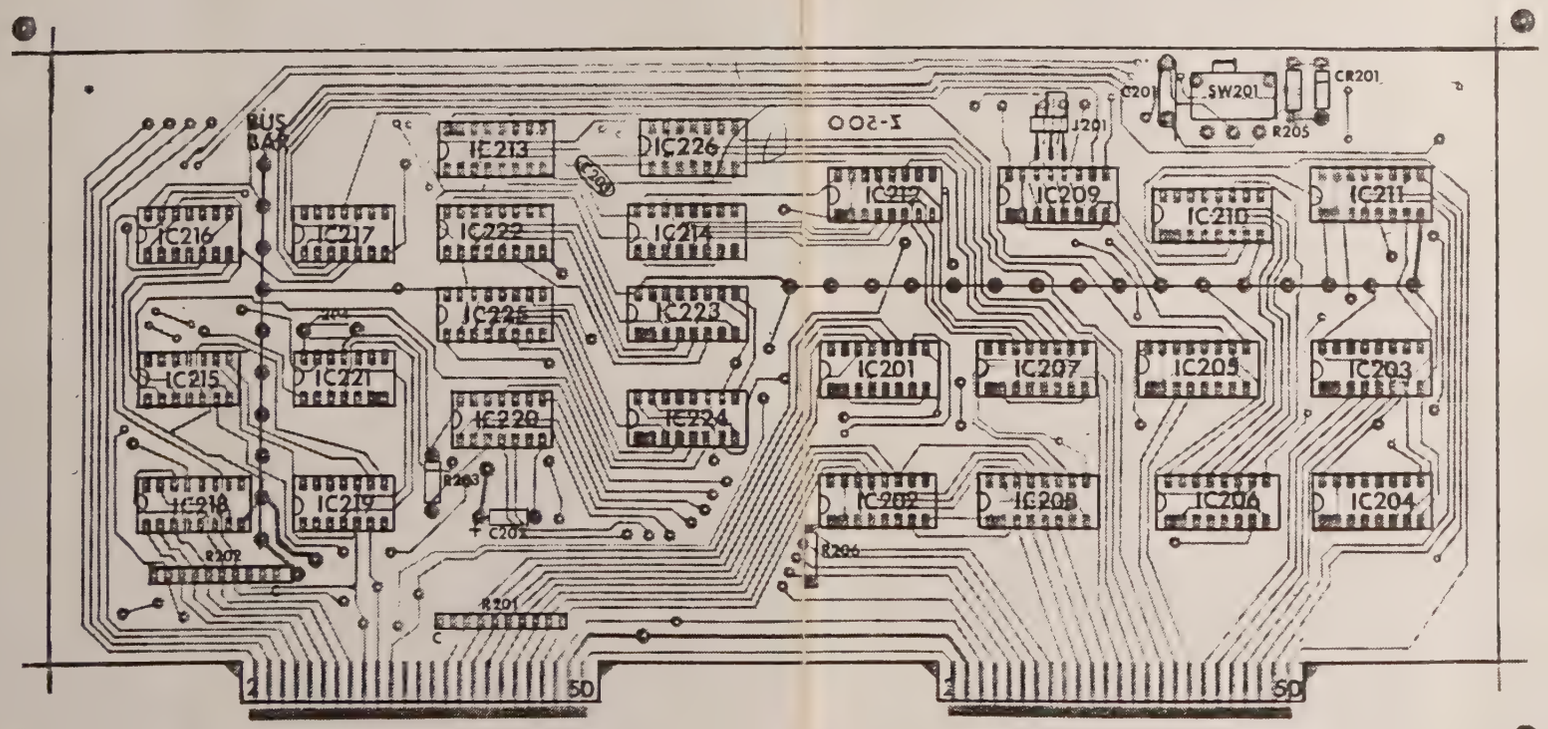
CATV SWEEP RECOVERY SYSTEM
MODEL 1865
VERT/HORIZ TIMING CARD
REV C



POWER CHART		+5V	GND
IC-	DEVICE		
101,103,104,107	MC74HC161AN	16	8
123,124,126,127	"	16	8
102,115	74S472	20	10
105,106	MC74HC175N	16	8
114	MC74HC00	14	7
110	CD4081B	14	7
108,109,111,112	MC74HC164AN	16	8
116	"	"	"
113	74LS05	14	7
100	74S471	20	10
117	MC74HC151	16	8
119	CD4011B	14	7
118	7400	14	7
120,121,122,125	MC74HC157N	16	8

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± ± .XXX ±	CONTRACT NO.	WAVETEK INDIANA, INC.
			APPROVALS / DATE	CONTROL REGISTER CARD PARTS LAYOUT
		MATERIAL	DRAWN DW	
		FINISH	CHECKED	SIZE B · CODE IDENT NO. 34280 · DRAWING NO. 0412-10-0004
NEXT ASSY	USED ON		REDRAWN TJM 6/28/83	SCALE · SHEET OF
APPLICATION		DO NOT SCALE DRAWING		

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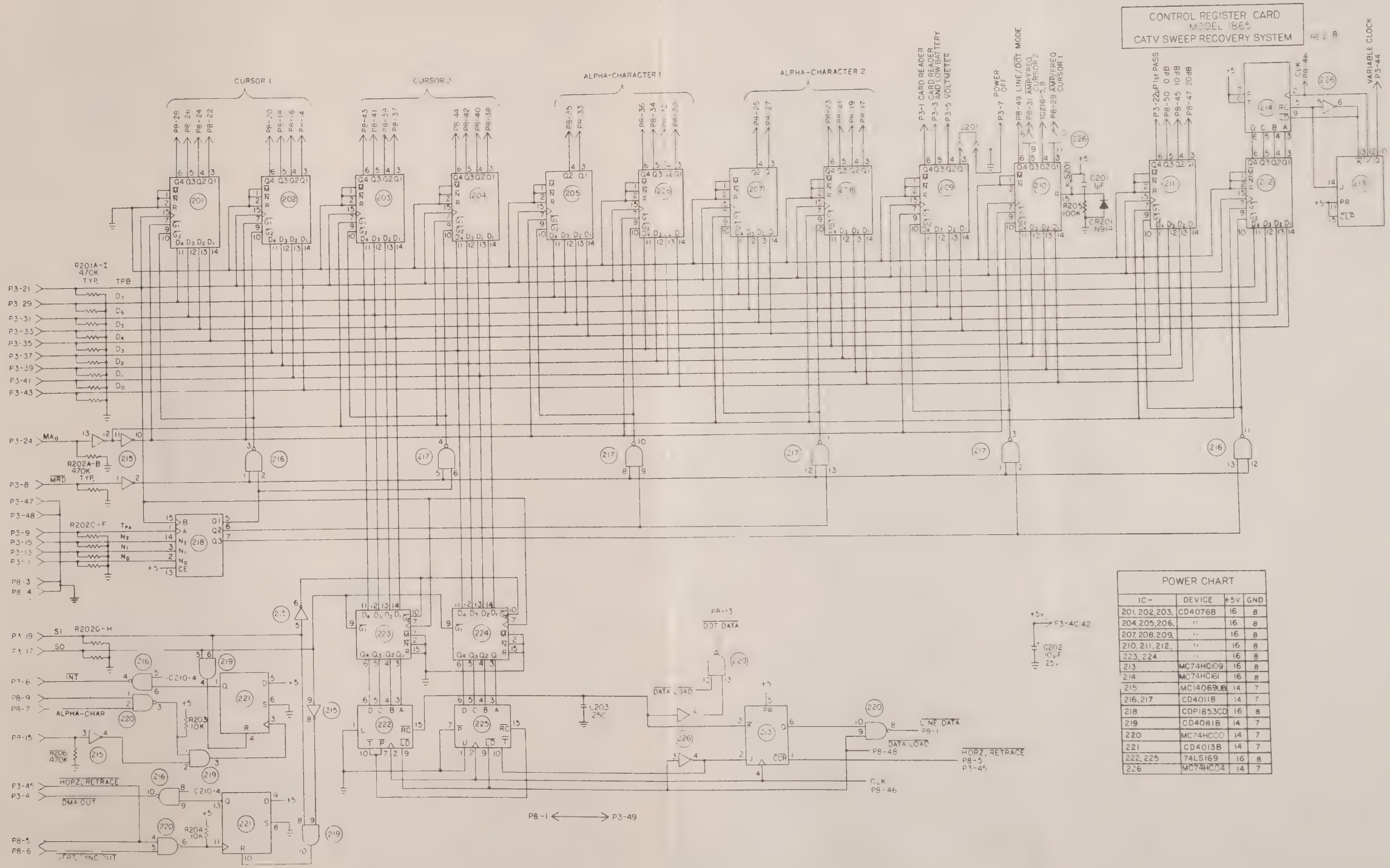
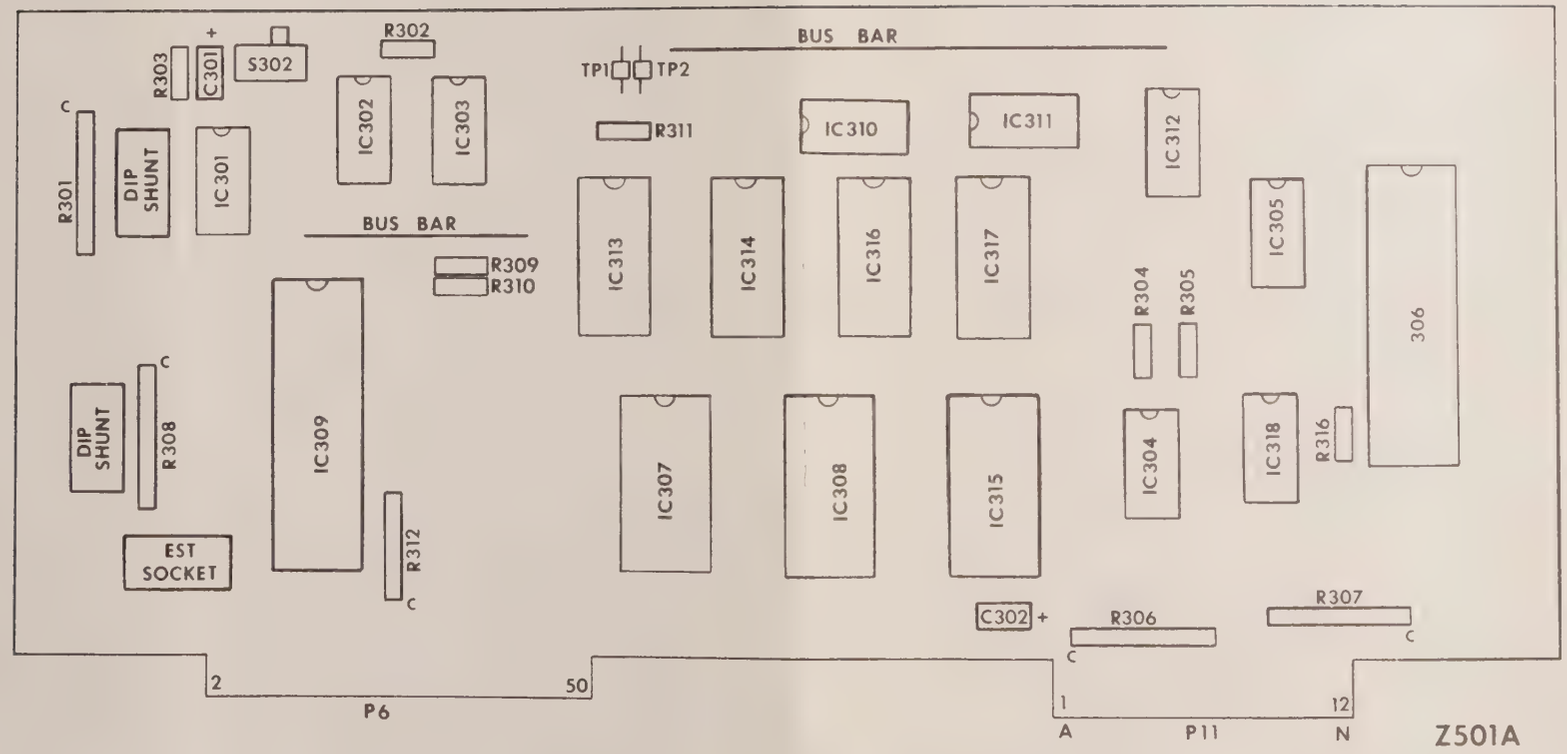
TELEDYNE POST N28549



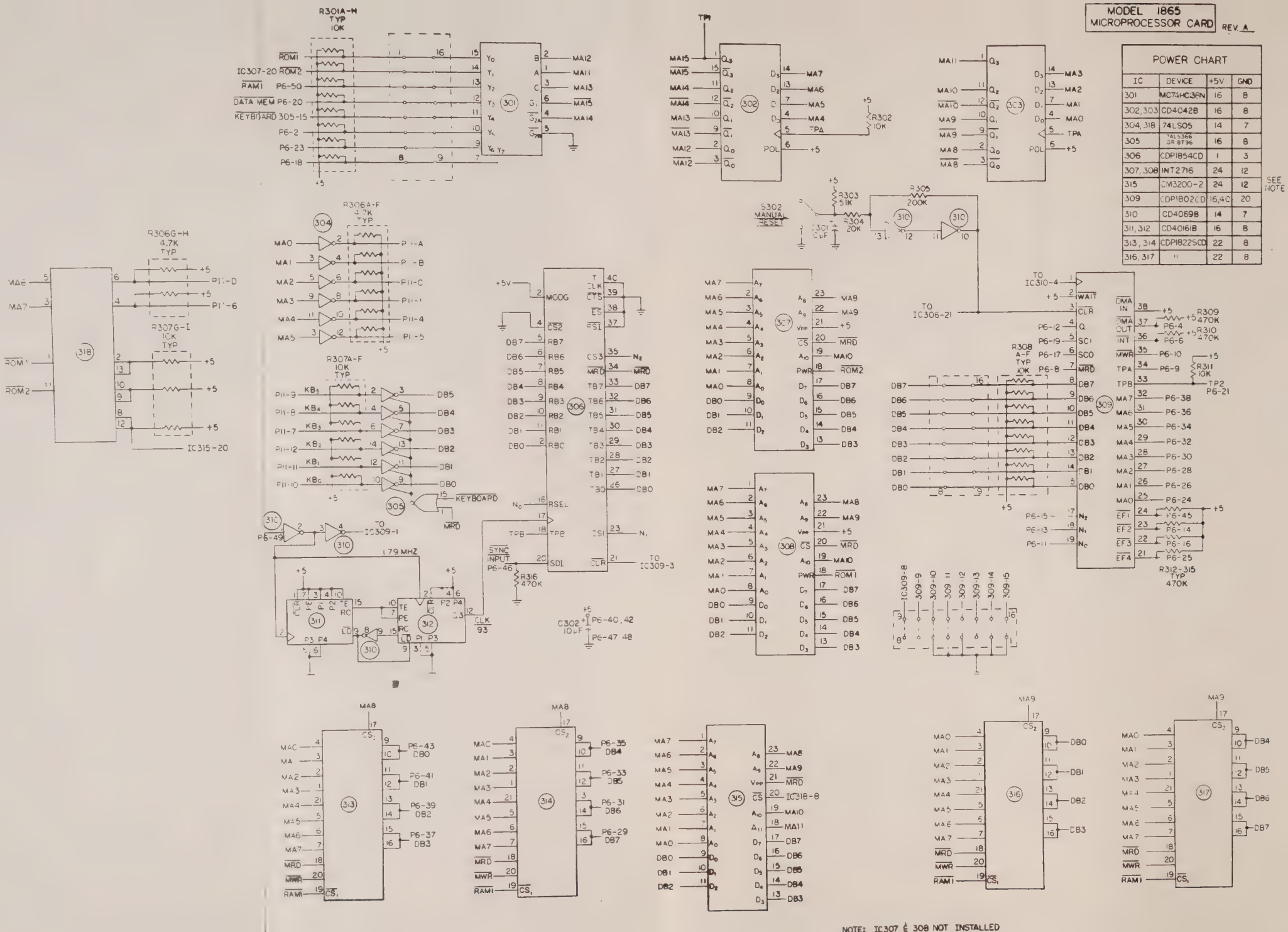
POWER CHART

IC-	DEVICE	+5V	GND
201, 202, 203,	CD4076B	16	8
204, 205, 206,	"	16	8
207, 208, 209,	"	16	8
210, 211, 212,	"	16	8
223, 224	"	16	8
213	MC74HC109	16	8
214	MC74HC161	16	8
215	MC14069UB	14	7
216, 217	CD4011B	14	7
218	CDP1853CD	16	8
219	CD4081B	14	7
220	MC74HC00	14	7
221	CD4013B	14	7
222, 225	74LS169	16	8
226	MC74HC04	14	7



NOTE: IC307 & 308 NOT INSTALLED
WHEN IC315 IS USED.

MODEL 1865 MICROPROCESSOR CARD REV. A

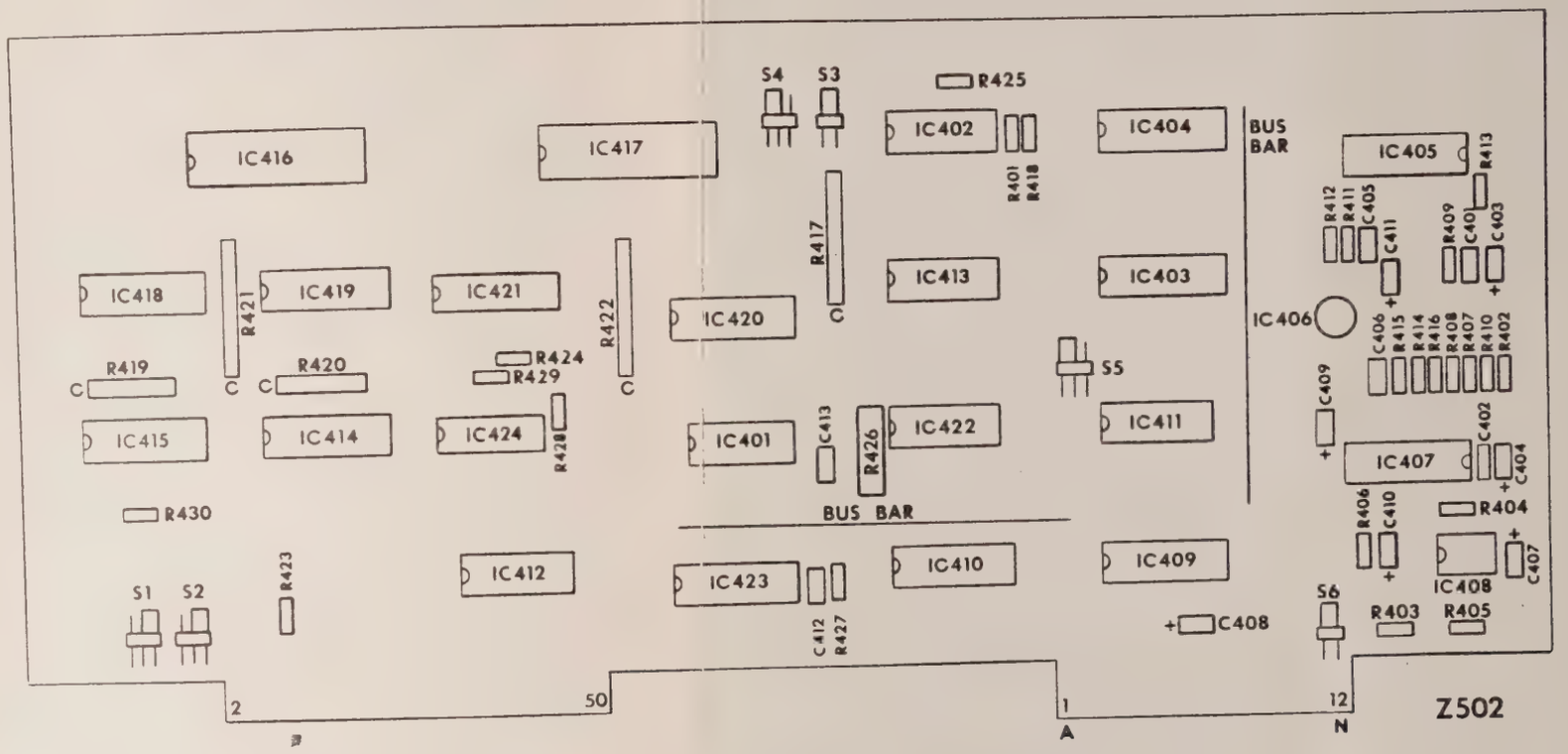


POWER CHART

IC	DEVICE	+5V	GND
301	MC74HC138N	16	8
302,303	CD4042B	16	8
304,318	74LS05	14	7
305	74LS366 OR 8T96	16	8
306	CDP1854CD	1	3
307,308	INT2716	24	12
315	CM3200-2	24	12
309	CDP1802CD	16,40	20
310	CD4069B	14	7
311,312	CD4011B	16	8
313,314	CDP1822SCD	22	8
316,317	"	22	8

SEE NOTE

NOTE: IC307 & 308 NOT INSTALLED WHEN IC315 IS USED.

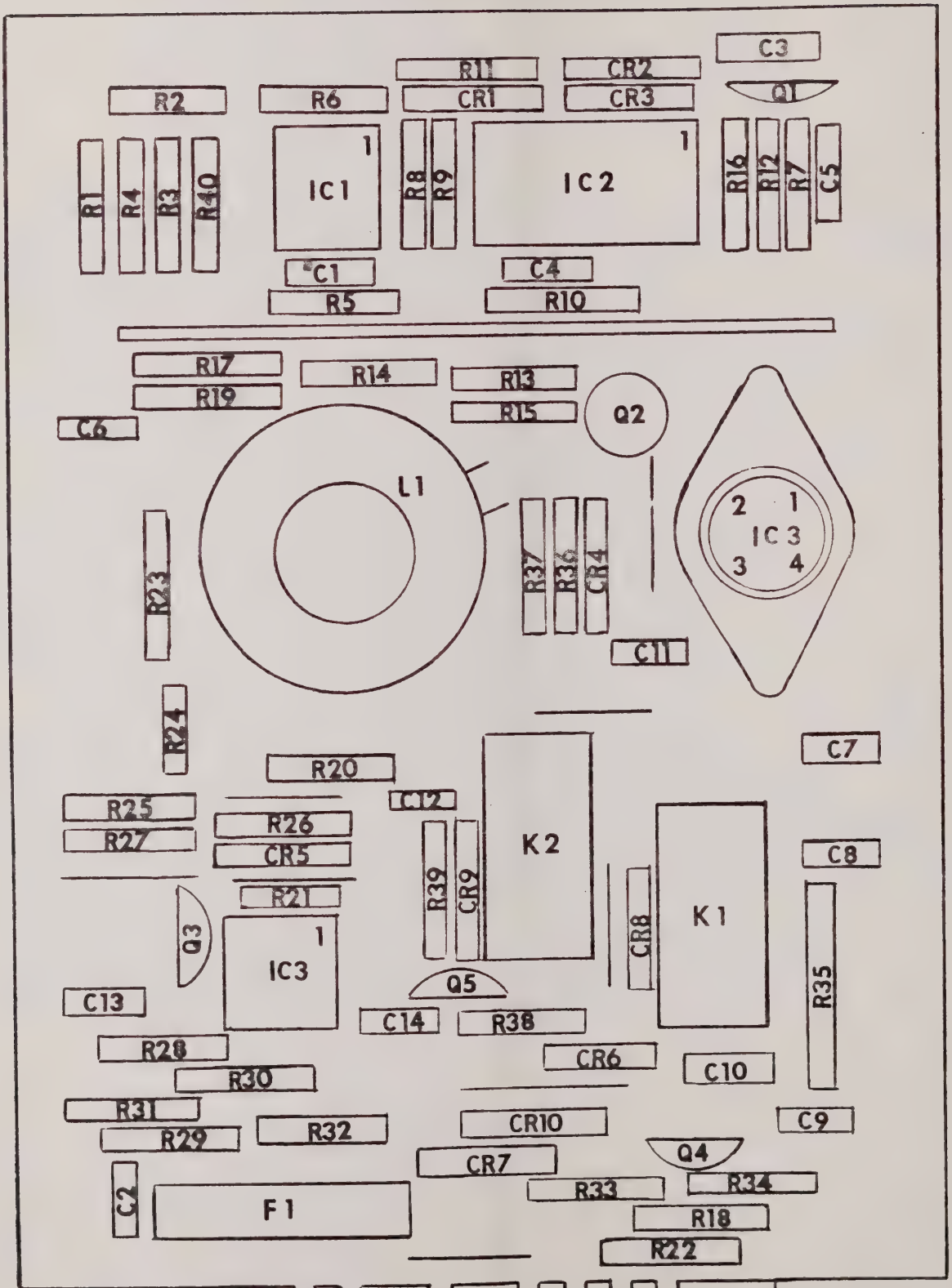

IC416
IC417
S4
S3
R425
IC402
IC404
BUS BAR
IC405
R413
R401 R418
R412 R411 C405
C411
R409 C401 C403
IC418
R421
IC419
IC421
R422
IC420
R417
IC413
IC403
IC406
C406 R415 R414 R416 R408 R407 R410 R402
R419
R420
R424 R429
S5
C409
IC415
IC414
IC424
R428
IC401
C413
R426
IC422
IC411
C402 C404
IC407
R406 C410
R404
BUS BAR
R430
IC412
IC423
IC410
IC409
S1
S2
R423
C412 R427
+C408
S6
R403
R405
IC408
C407
2
50
1
12
A
N
Z502

CATV SWEEP RECOVERY SYSTEM
MODEL 1865 RECEIVER
A/D-DATA MEMORY CARD

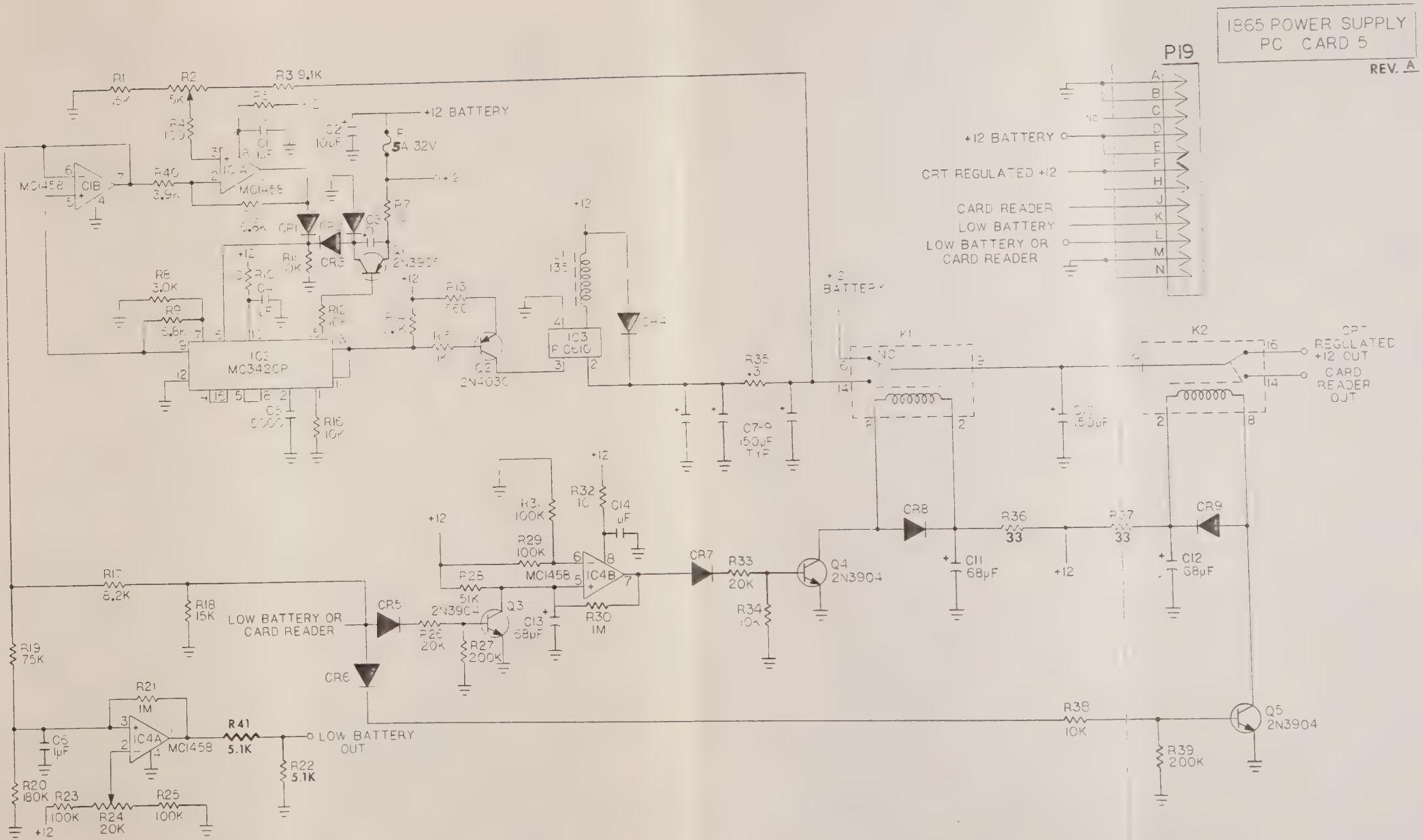
POWER CHART

IC	LEVEL	-5	+5	+5A	-5A
401					
402,403,404					
405,406,407					
408	REF				
409	AM2502				
410	MC1741CP1				
411	MC1411				
412,415	MC1741CL23				
413,417	MCM2128L-3				
414,419	MC1741CL-6TB				
416,421	MCM2128L-3				
423					
424	MC14013				

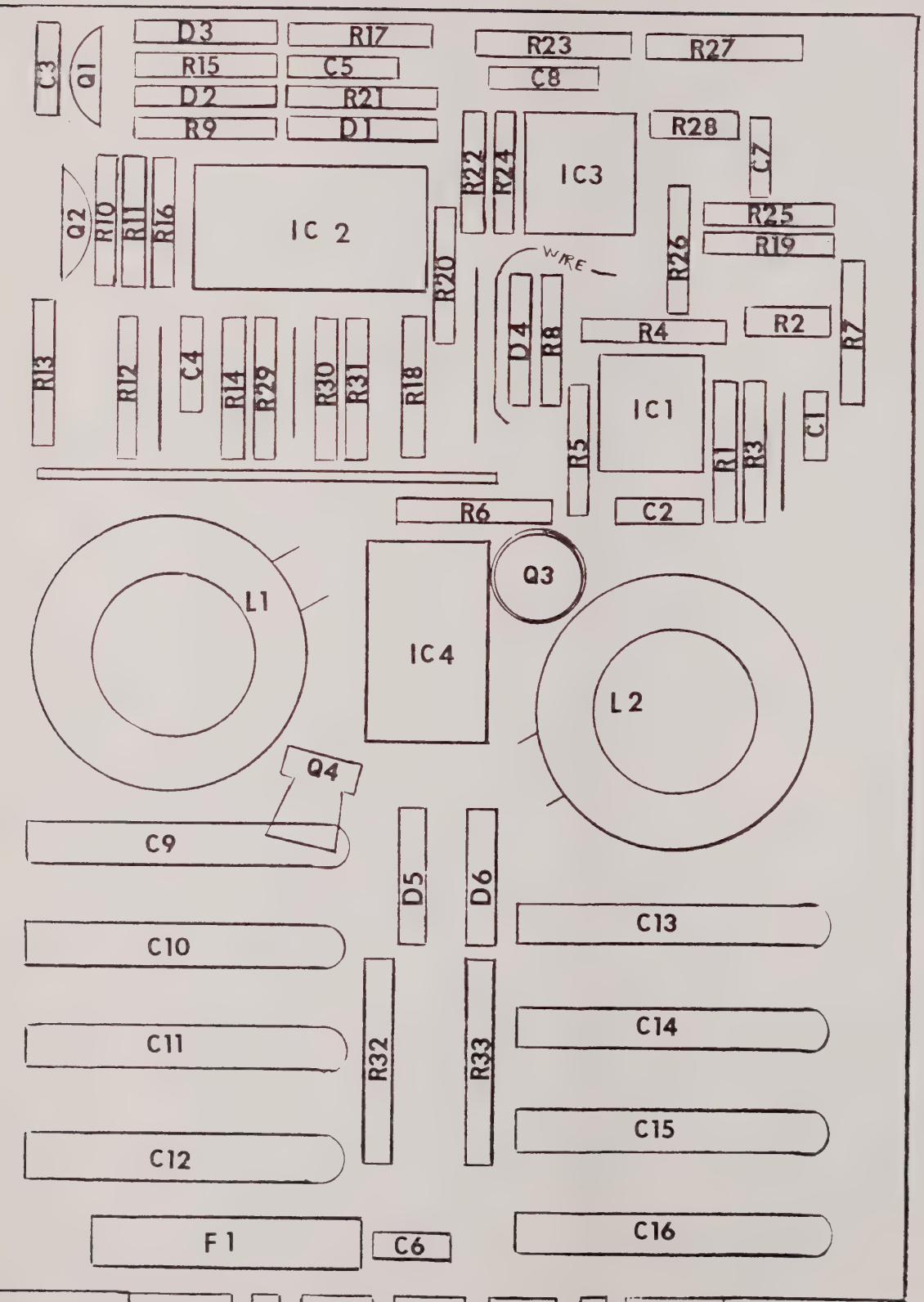
BOARD 5



Z 513 Rev

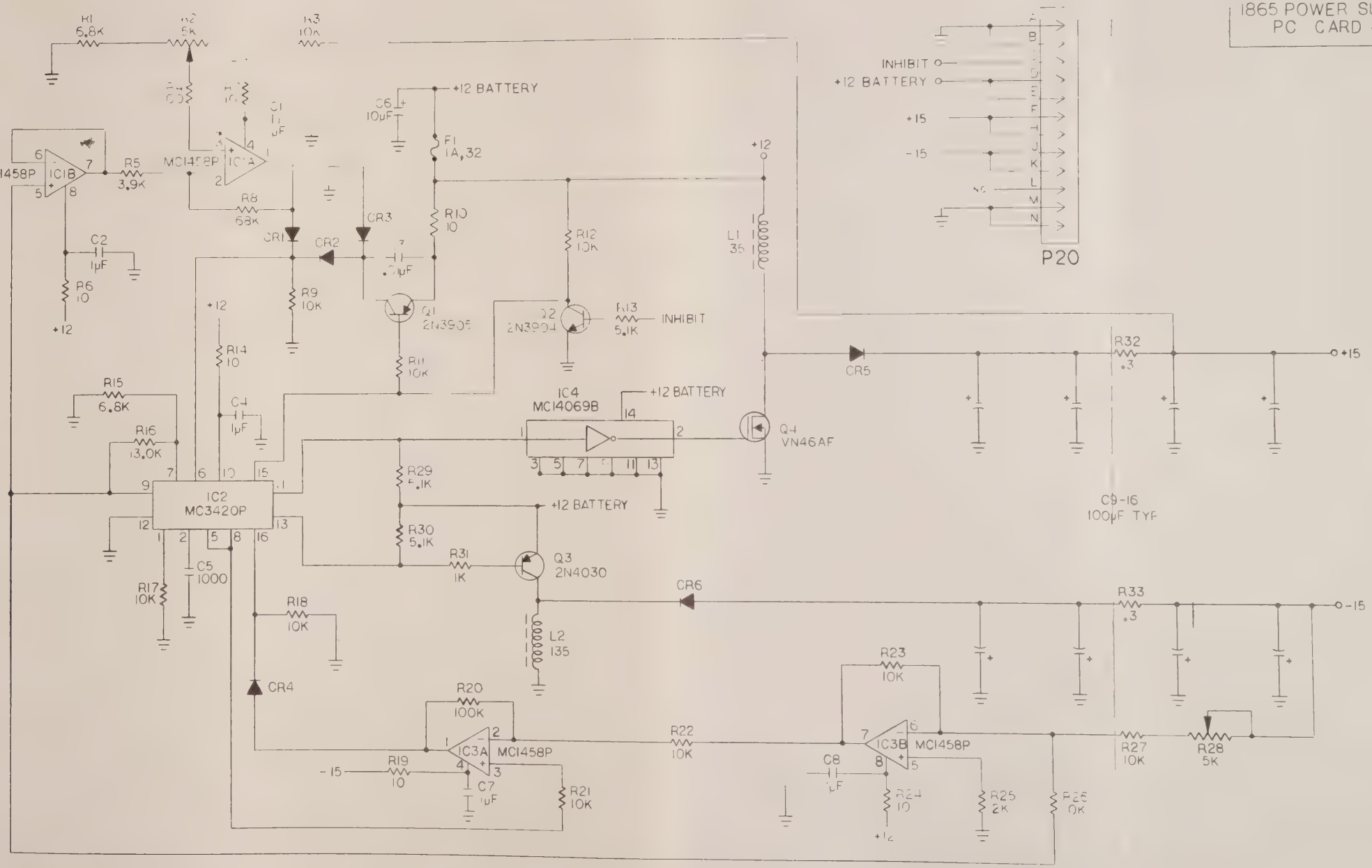

1865 POWER SUPPLY
PC CARD 5
REV. A
P19
+12 BATTERY
CRT REGULATED +12
CARD READER
LOW BATTERY
LOW BATTERY OR CARD READER
+12 BATTERY
5A 32V
MC1458
MC3420P
P 0810
2N3904
2N4030
K1
K2
CRT REGULATED +12 OUT
CARD READER OUT
LOW BATTERY OR CARD READER
LOW BATTERY OUT
R1
R2
R3 9.1K
R4 100
R5 5.6K
R6 3.0K
R7
R8 3.0K
R9 5.6K
R10
R11
R12
R13 FEC
R14
R15 1M
R16 10K
R17 8.2K
R18 15K
R19 75K
R20 180K
R21 1M
R22 5.1K
R23 100K
R24 20K
R25 100K
R26 51K
R27 200K
R28 20K
R29 100K
R30 1M
R31 100K
R32 1K
R33 20K
R34 10K
R35 .3
R36 33
R37 33
R38 10K
R39 200K
R41 5.1K
C1 .1uF
C2 10uF
C3
C4
C5 .05uF
C6 1uF
C7-A 150uF TYP
C10 150uF
C11 68uF
C12 68uF
C13 68uF
C14 uF
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
Q1
Q2
Q3
Q4 2N3904
Q5 2N3904
IC1A
IC1B
IC2
IC3
IC4A
IC4B
NC

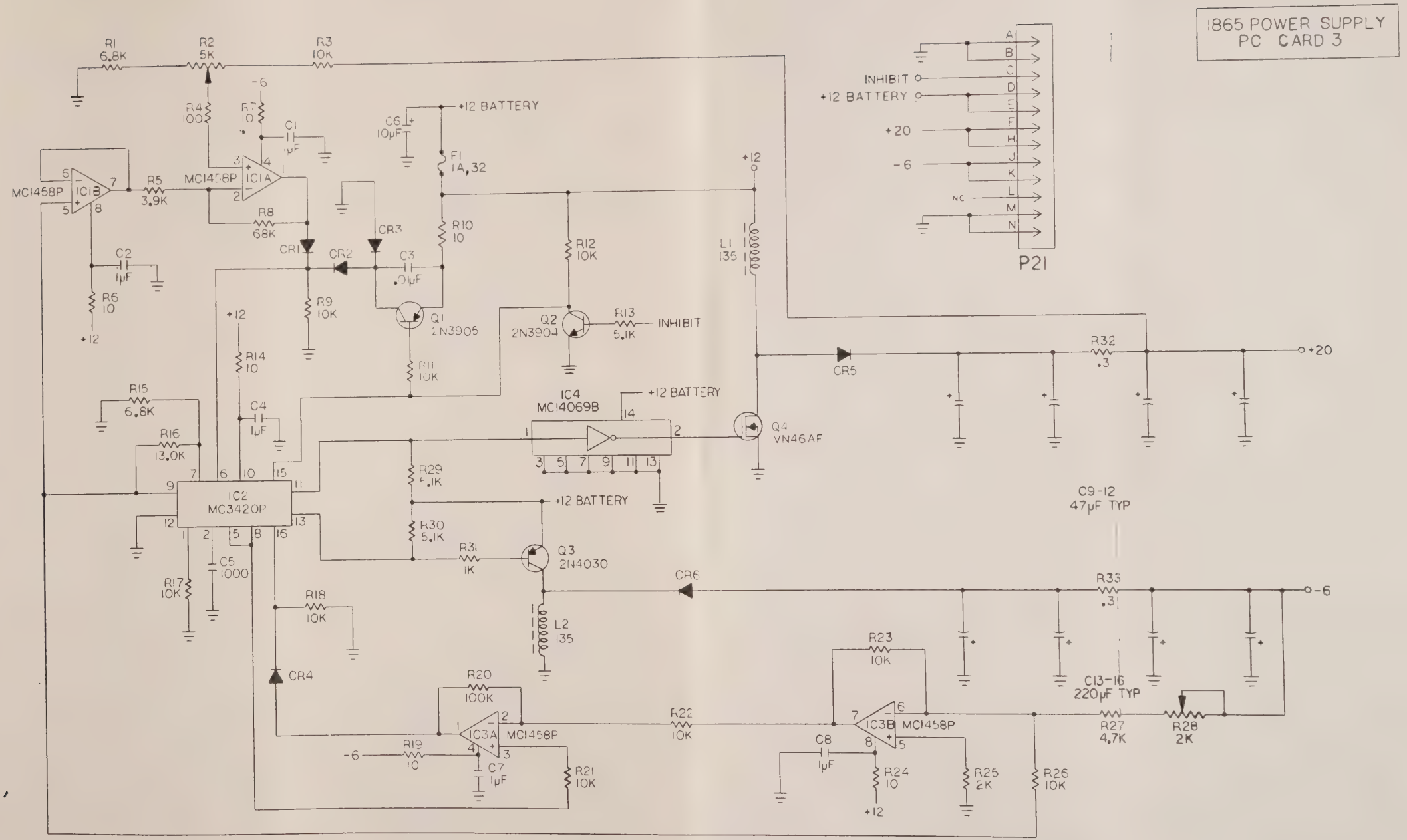
BOARD 3+4



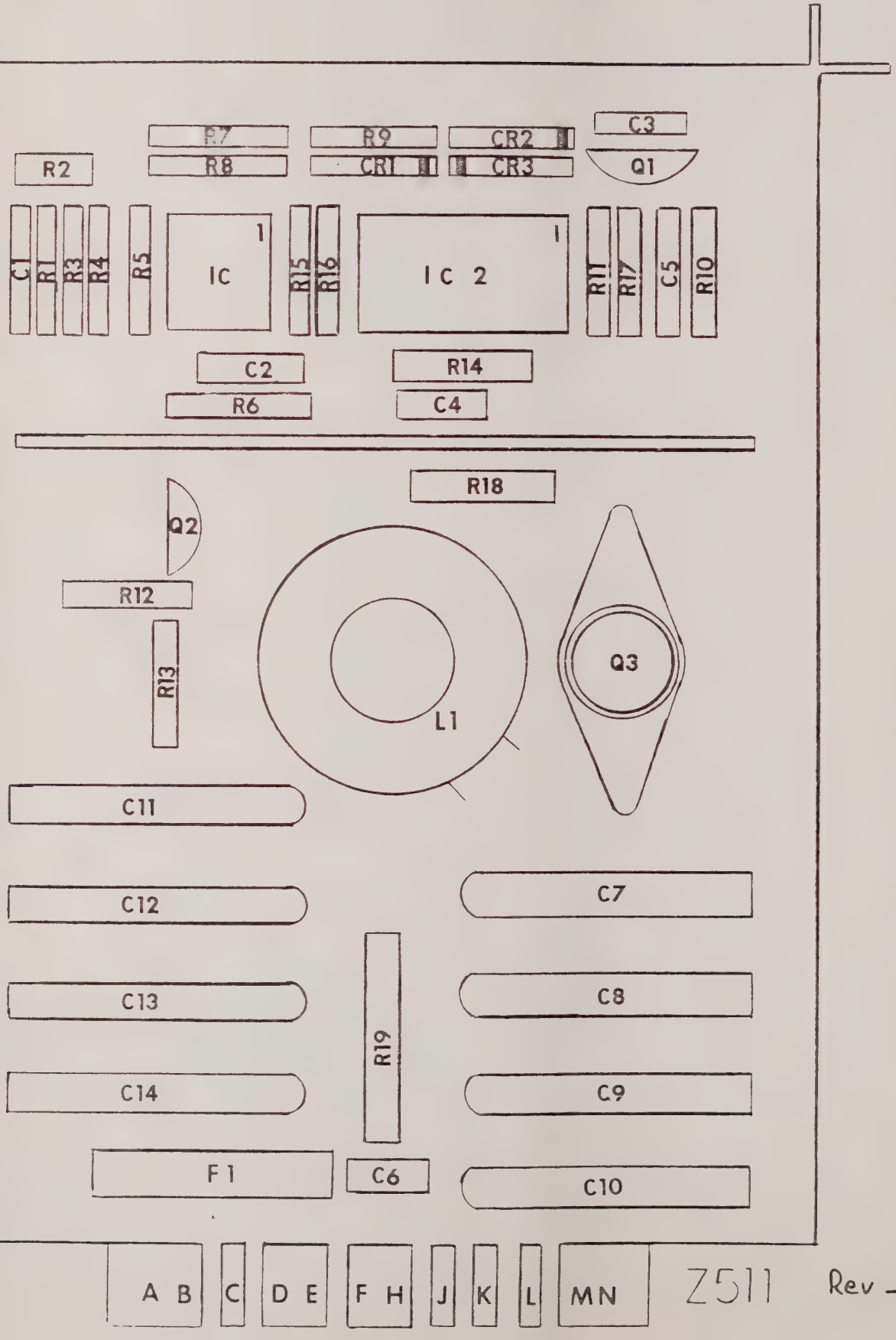
Z 512 Rev___

1865 POWER SUPPLY PC CARD 4



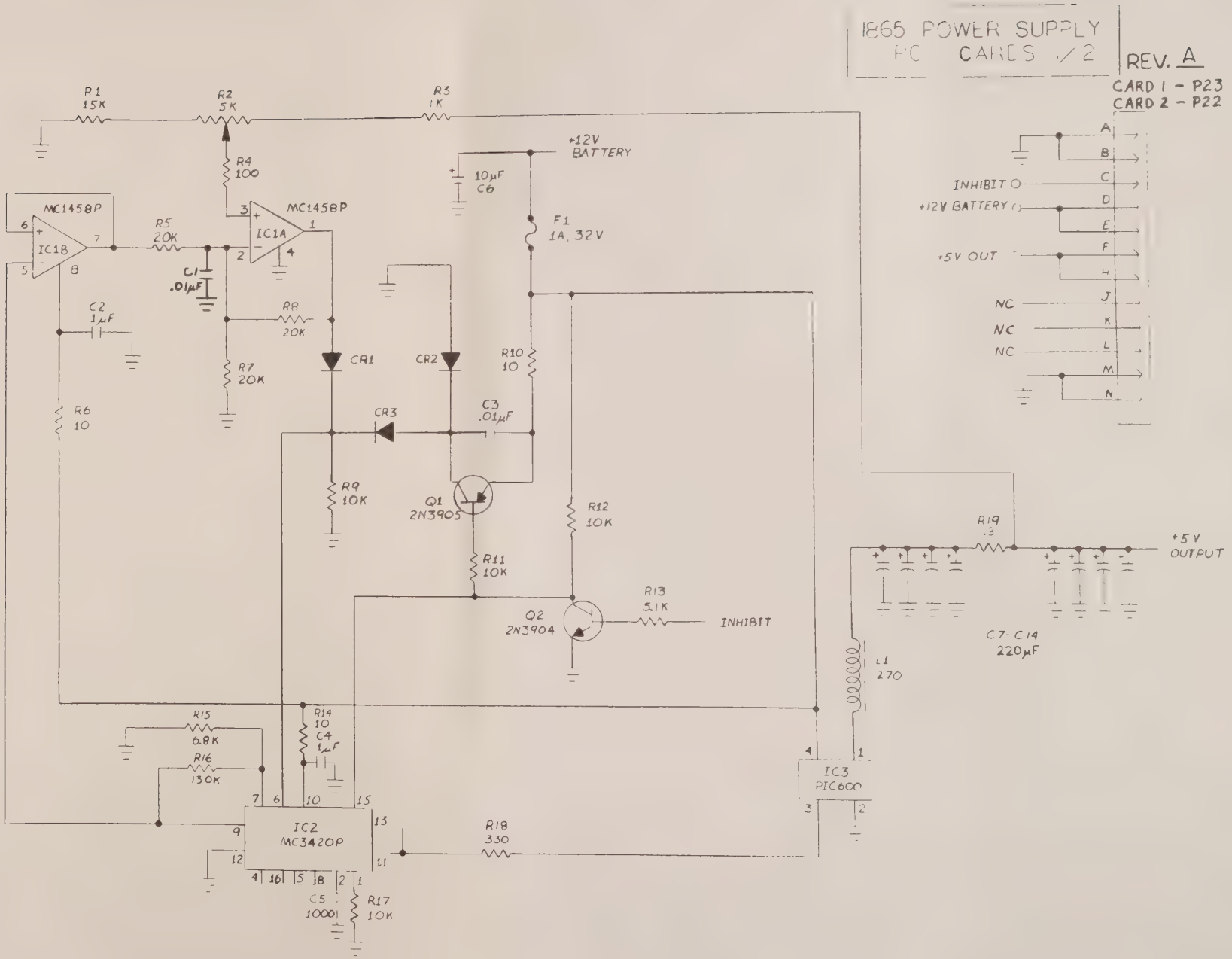

1865 POWER SUPPLY
PC CARD 3
P21
INHIBIT
+12 BATTERY
+20
-6
NC
R1 6.8K
R2 5K
R3 10K
R4 100
R7 10
C1 1µF
C6 10µF
F1 1A,32
+12 BATTERY
MC1458P IC1B
MC1458P IC1A
R5 3.9K
R8 68K
CR1
CR2
CR3
C2 1µF
C3 .01µF
R6 10
R9 10K
R10 10
R12 10K
L1 135
Q1 2N3905
Q2 2N3904
R13 5.1K
INHIBIT
R14 10
R11 10K
R15 6.8K
C4 1µF
R16 13.0K
IC4 MC14069B
Q4 VN46AF
CR5
R32 .3
IC2 MC3420P
R29 5.1K
R30 5.1K
R31 1K
Q3 2N4030
C5 1000
R17 10K
R18 10K
L2 135
CR6
R33 .3
C9-12 47µF TYP
C13-16 220µF TYP
R27 4.7K
R28 2K
CR4
R20 100K
IC3A MC1458P
R19 10
C7 1µF
R21 10K
R22 10K
R23 10K
IC3B MC1458P
C8 1µF
R24 10
R25 2K
R26 10K

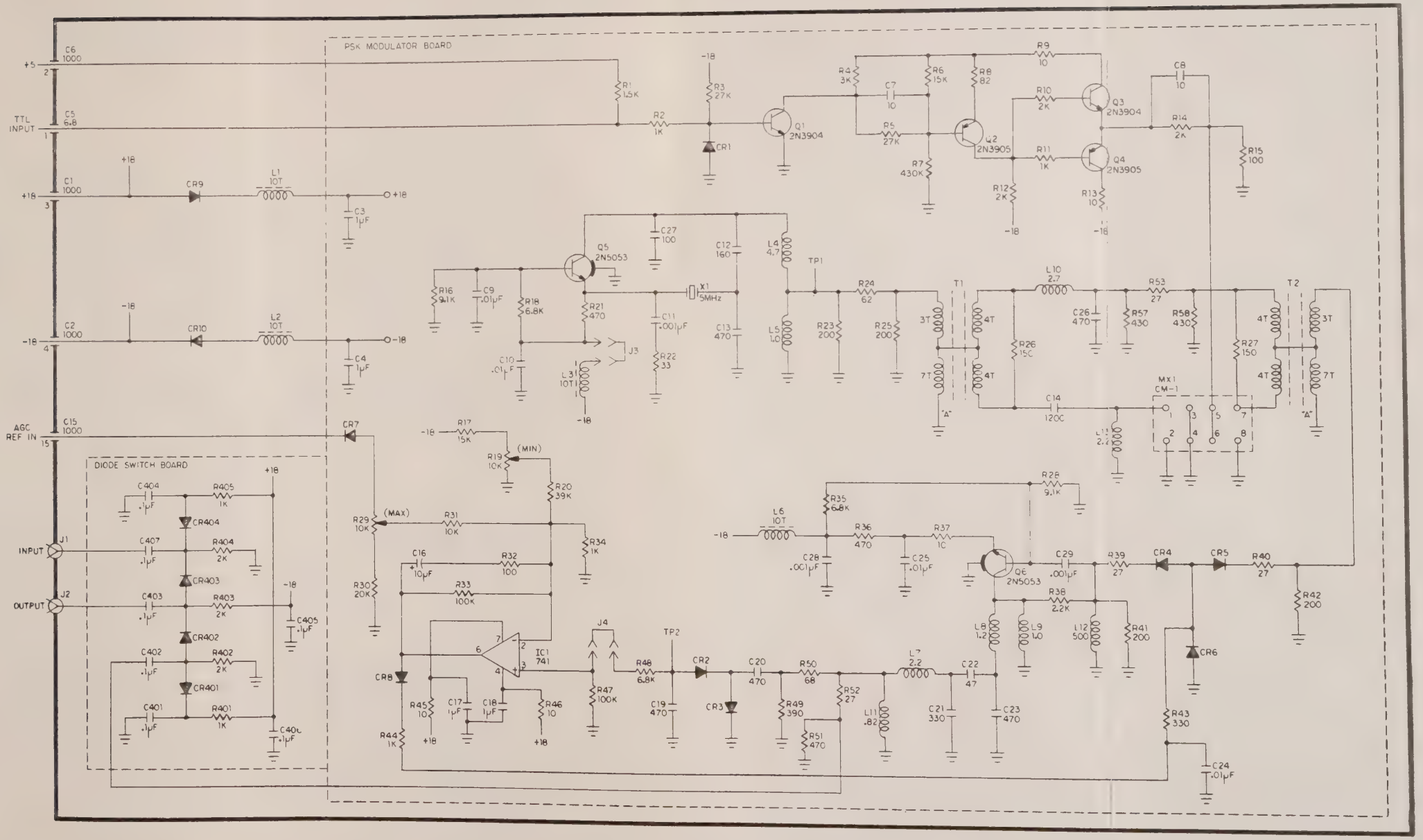
BOARD 1+2



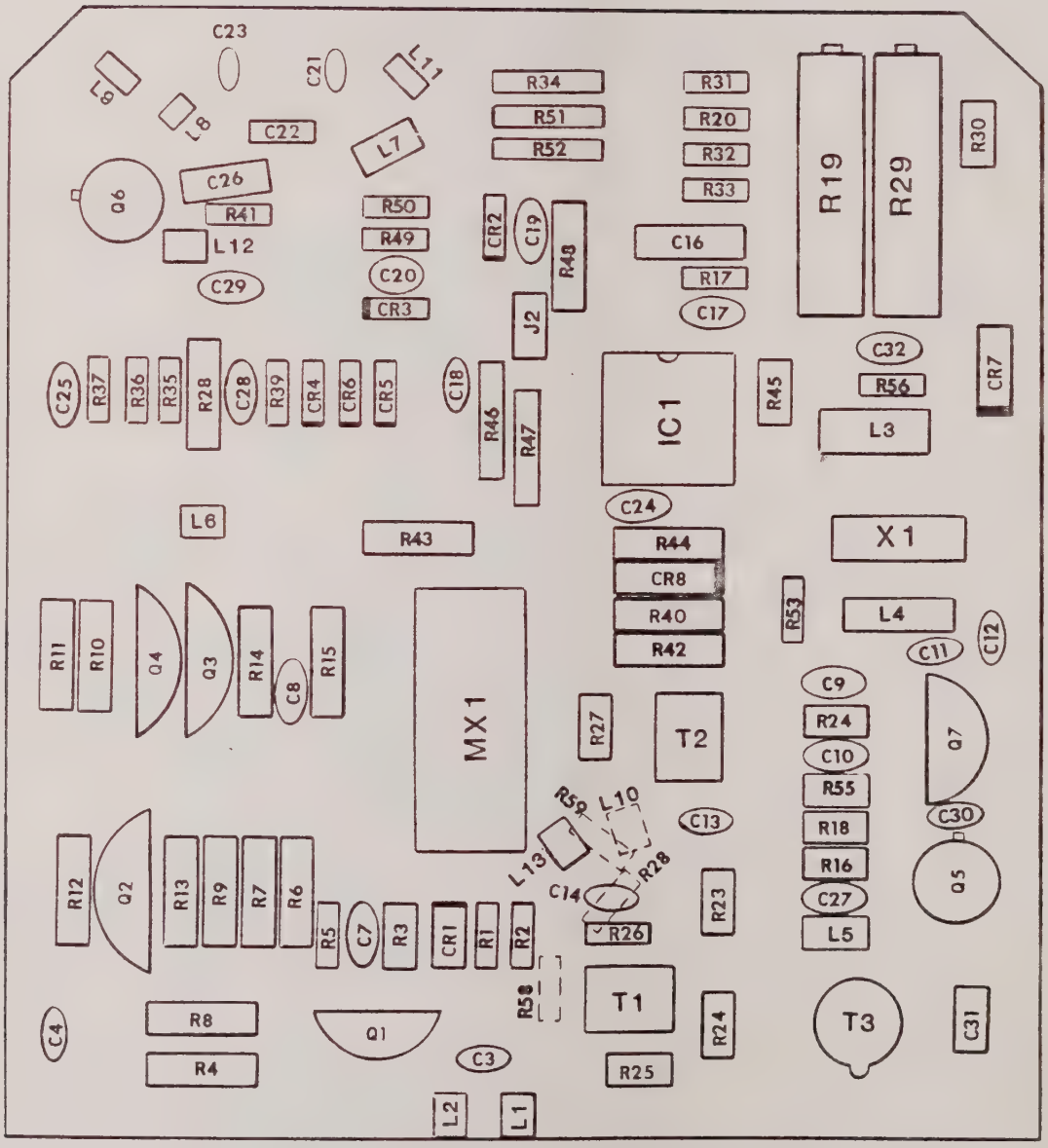
Z511

Rev A

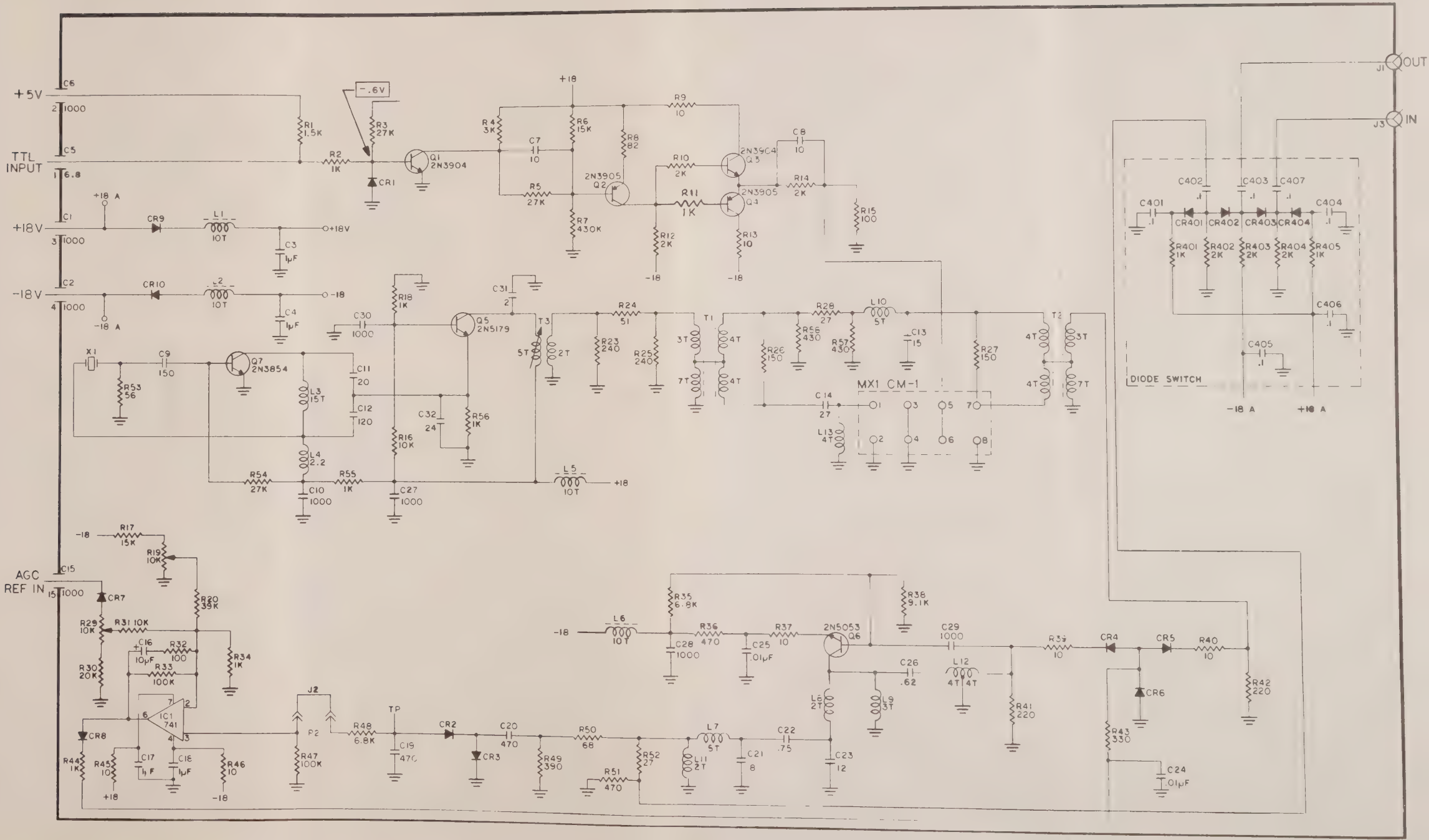

1865 POWER SUPPLY
PC CARDS 1/2
REV. A
CARD 1 - P23
CARD 2 - P22
A
B
C
D
E
F
H
J
K
L
M
N
INHIBIT
+12V BATTERY
+5V OUT
NC
NC
NC
P1
15K
R2
5K
R3
1K
R4
100
MC1458P
IC1A
IC1B
R5
20K
C1
.01µF
C2
1µF
R8
20K
R7
20K
R6
10
+12V
BATTERY
10µF
C6
F1
1A, 32V
CR1
CR2
CR3
R10
10
C3
.01µF
R9
10K
Q1
2N3905
R11
10K
R12
10K
R13
5.1K
Q2
2N3904
INHIBIT
R19
.3
+5V
OUTPUT
C7-C14
220µF
L1
270
IC3
PIC600
R15
6.8K
R16
130K
R14
10
C4
1µF
IC2
MC3420P
R18
330
C5
1000
R17
10K


PSK MODULATOR BOARD
DIODE SWITCH BOARD
+5
TTL INPUT
+18
-18
AGC REF IN
INPUT
OUTPUT
J1
J2
J3
J4
C6 1000
C5 6.8
C1 1000
C2 1000
C15 1000
C3 1μF
C4 1μF
C405 .1μF
C40L .1μF
CR9
CR10
L1 10T
L2 10T
CR7
CR1
CR2
CR3
CR4
CR5
CR6
CR8
CR401
CR402
CR403
CR404
R1 1.5K
R2 1K
R3 27K
R4 3K
R5 27K
R6 15K
R7 430K
R8 82
R9 10
R10 2K
R11 1K
R12 2K
R13 10
R14 2K
R15 100
C7 10
C8 10
Q1 2N3904
Q2 2N3905
Q3 2N3904
Q4 2N3905
Q5 2N5053
Q6 2N5053
R16 9.1K
R17 15K
R18 6.8K
R19 10K (MIN)
R20 39K
R21 470
R22 33
R23 200
R24 62
R25 200
R26 15C
R27 150
R28 9.1K
R29 10K (MAX)
R30 20K
R31 10K
R32 100
R33 100K
R34 1K
R35 6.8K
R36 470
R37 1C
R38 2.2K
R39 27
R40 27
R41 200
R42 200
R43 330
R44 1K
R45 10
R46 10
R47 100K
R48 6.8K
R49 390
R50 68
R51 470
R52 27
R53 27
R57 430
R58 430
C9 .01μF
C10 .01μF
C11 .001μF
C12 160
C13 470
C16 10μF
C17 1μF
C18 1μF
C19 470
C20 470
C21 330
C22 47
C23 470
C24 .01μF
C25 .01μF
C26 470
C27 100
C28 .001μF
C29 .001μF
C401 .1μF
C402 .1μF
C403 .1μF
C404 .1μF
C407 .1μF
L3 10T
L4 4.7
L5 1.0
L6 10T
L7 2.2
L8 1.2
L9 1.0
L10 2.7
L11 .82
L12 500
X1 5MHz
IC1 741
TP1
TP2
T1
T2
MX1 CM-1
3T
4T
7T
"A"
(MAX)
(MIN)

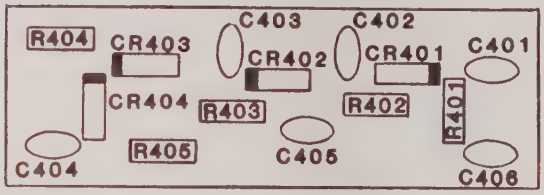
M135-155

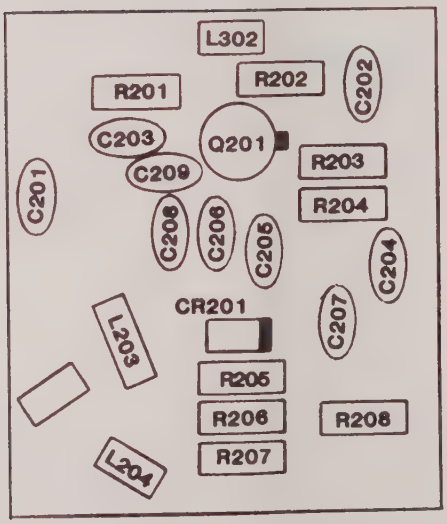

C23
C21
L11
L9
L8
C22
L7
C26
R41
L12
C29
Q6
R50
R49
C20
CR3
R34
R51
R52
CR2
C19
R48
J2
R31
R20
R32
R33
C16
R17
C17
R19
R29
R30
C32
R56
L3
CR7
C25
R37
R36
R35
R28
C28
R39
CR4
CR6
CR5
C18
R46
R47
IC1
R45
C24
L6
R43
R44
CR8
R40
R42
X1
R53
L4
C11
C12
R11
R10
Q4
Q3
R14
C8
R15
MX1
R27
T2
C9
R24
C10
R55
R18
R16
C27
L5
Q7
C30
Q5
R59
L10
L13
C14
R28
C13
R12
Q2
R13
R9
R7
R6
R5
C7
R3
CR1
R1
R2
R26
R23
R58
T1
R24
T3
C31
C4
R8
R4
Q1
C3
R25
L2
L1

PSK MODULATOR
M135-155
REV A

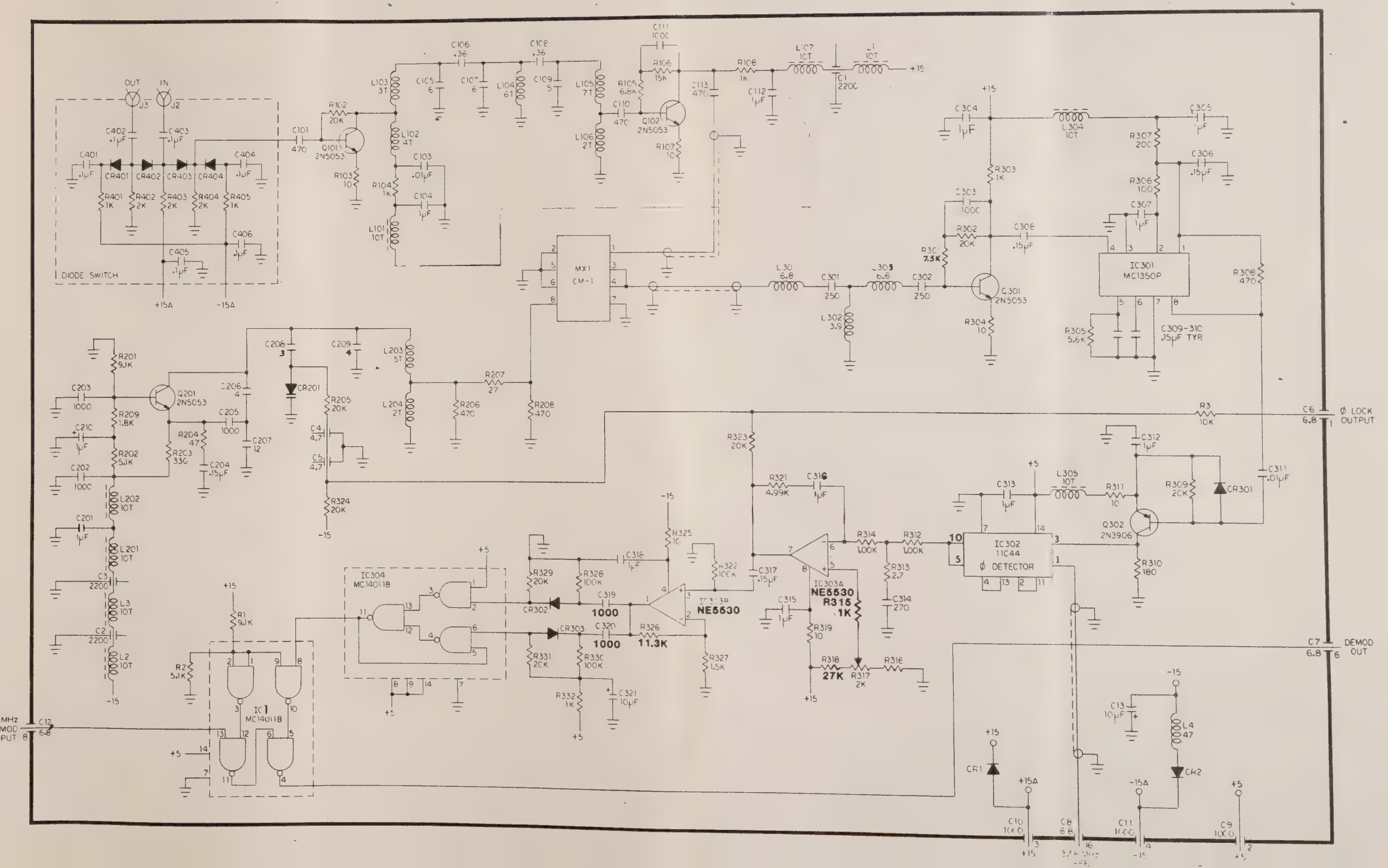


M119-155
DIODE SWITCH BOARD

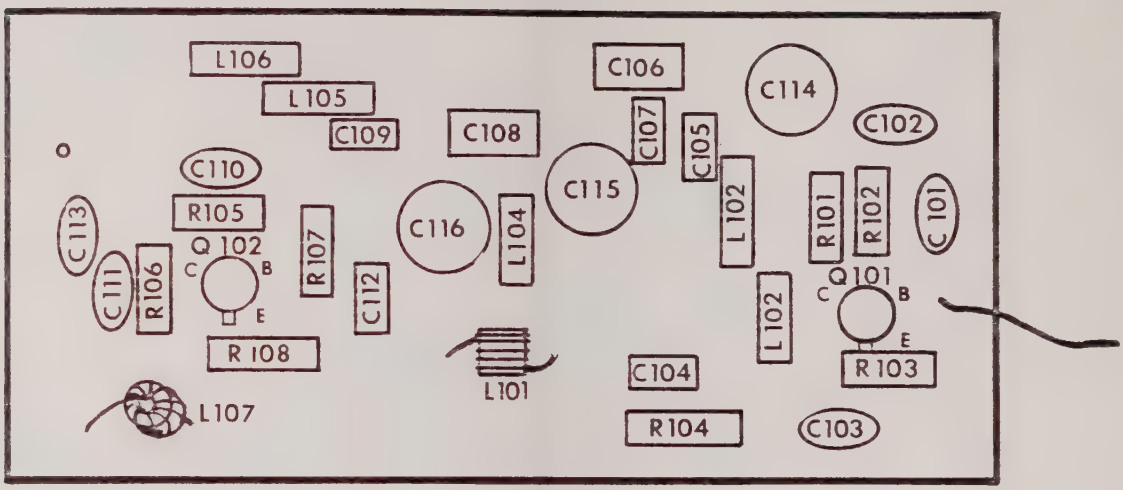


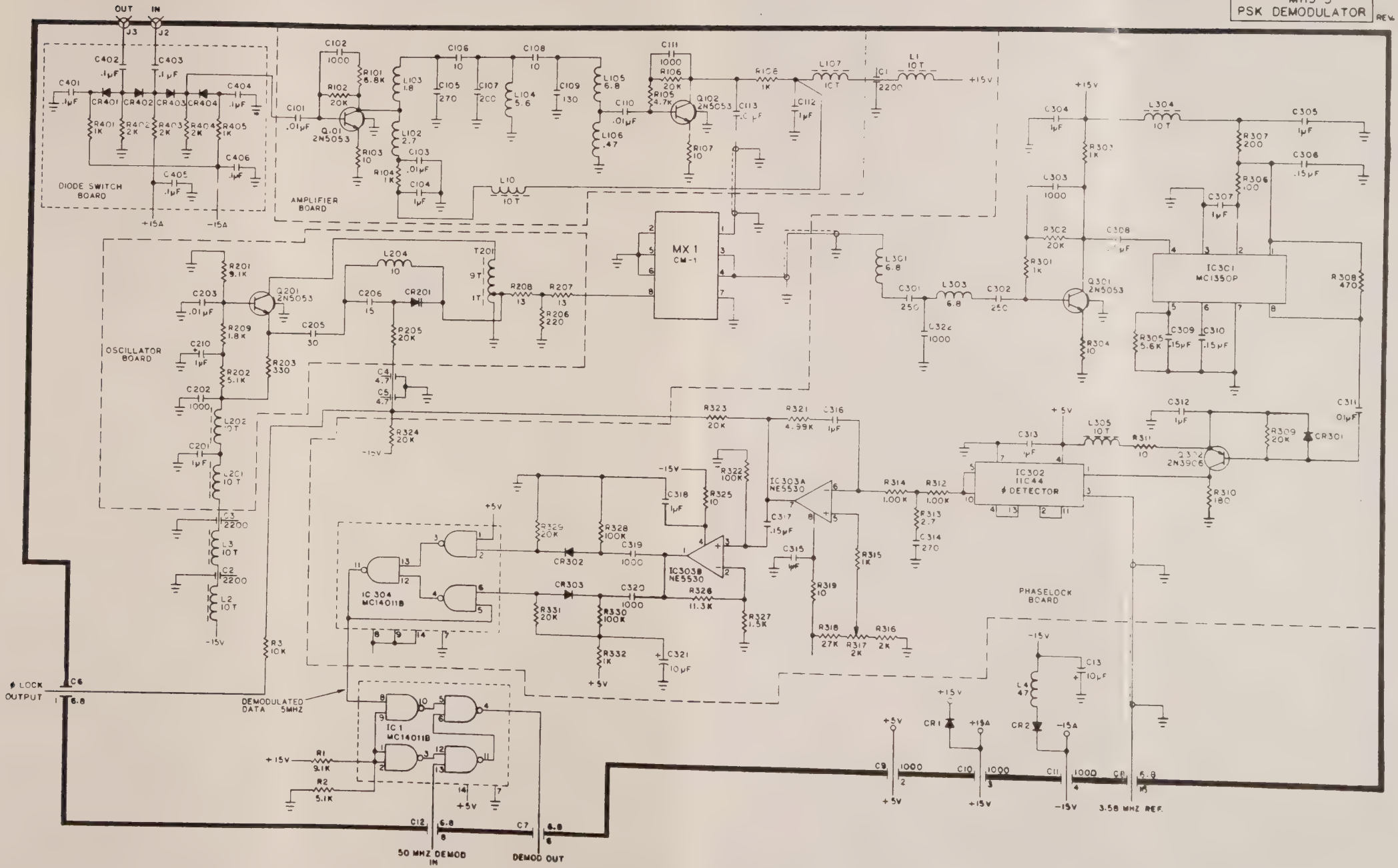


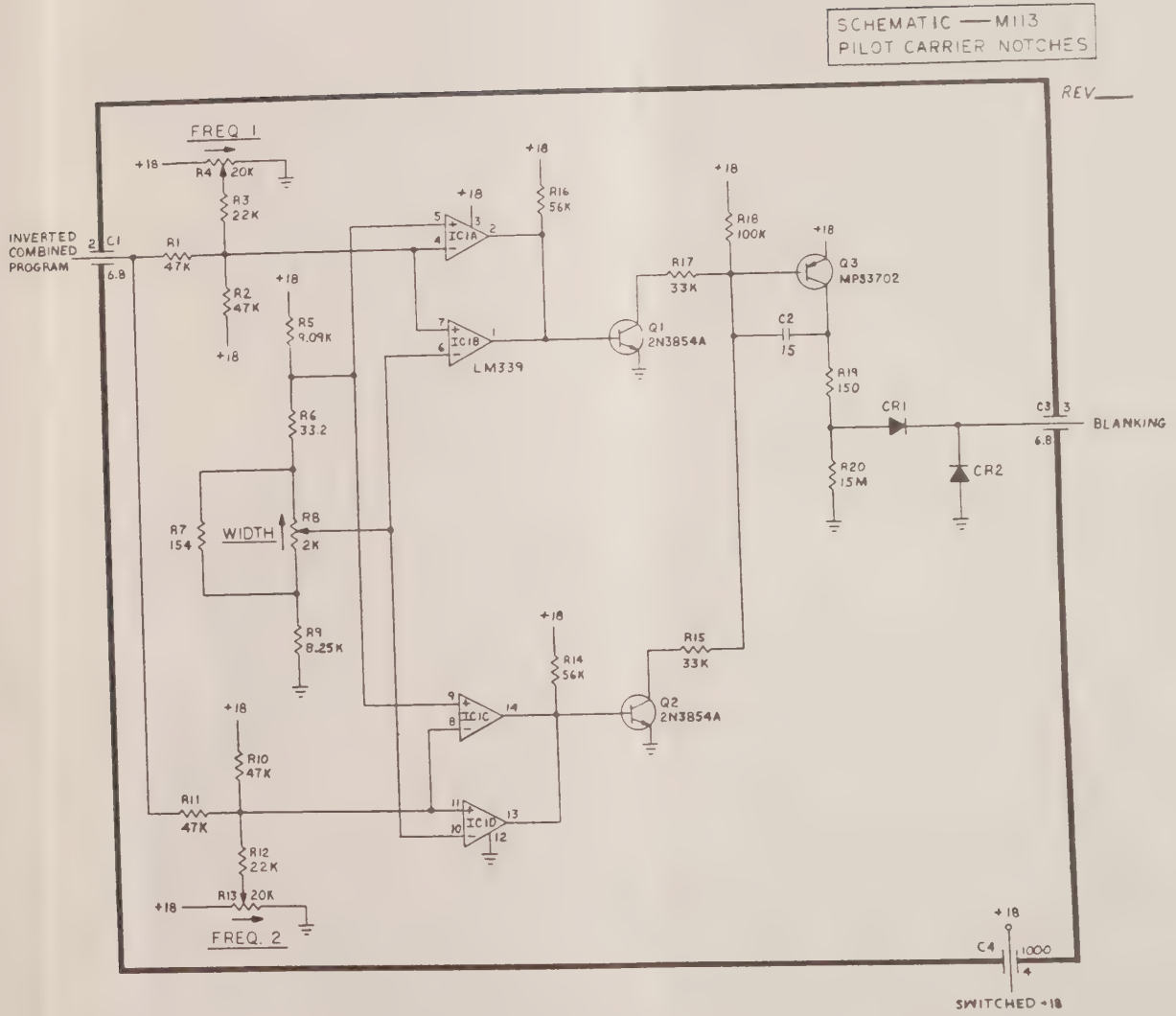
M119-155
PSK DEMODULATOR REV. B



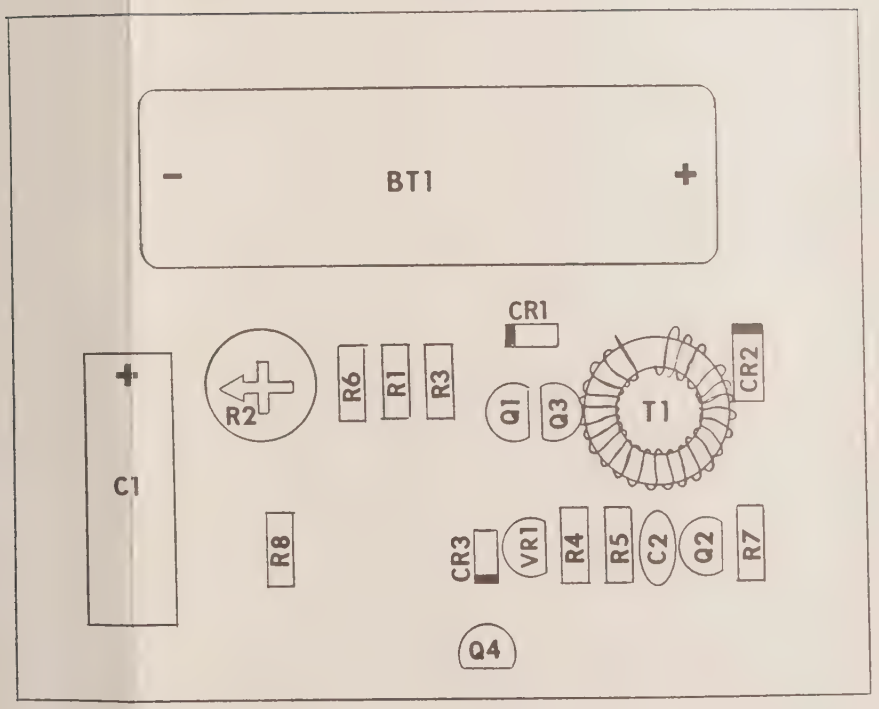
1218-00-0433

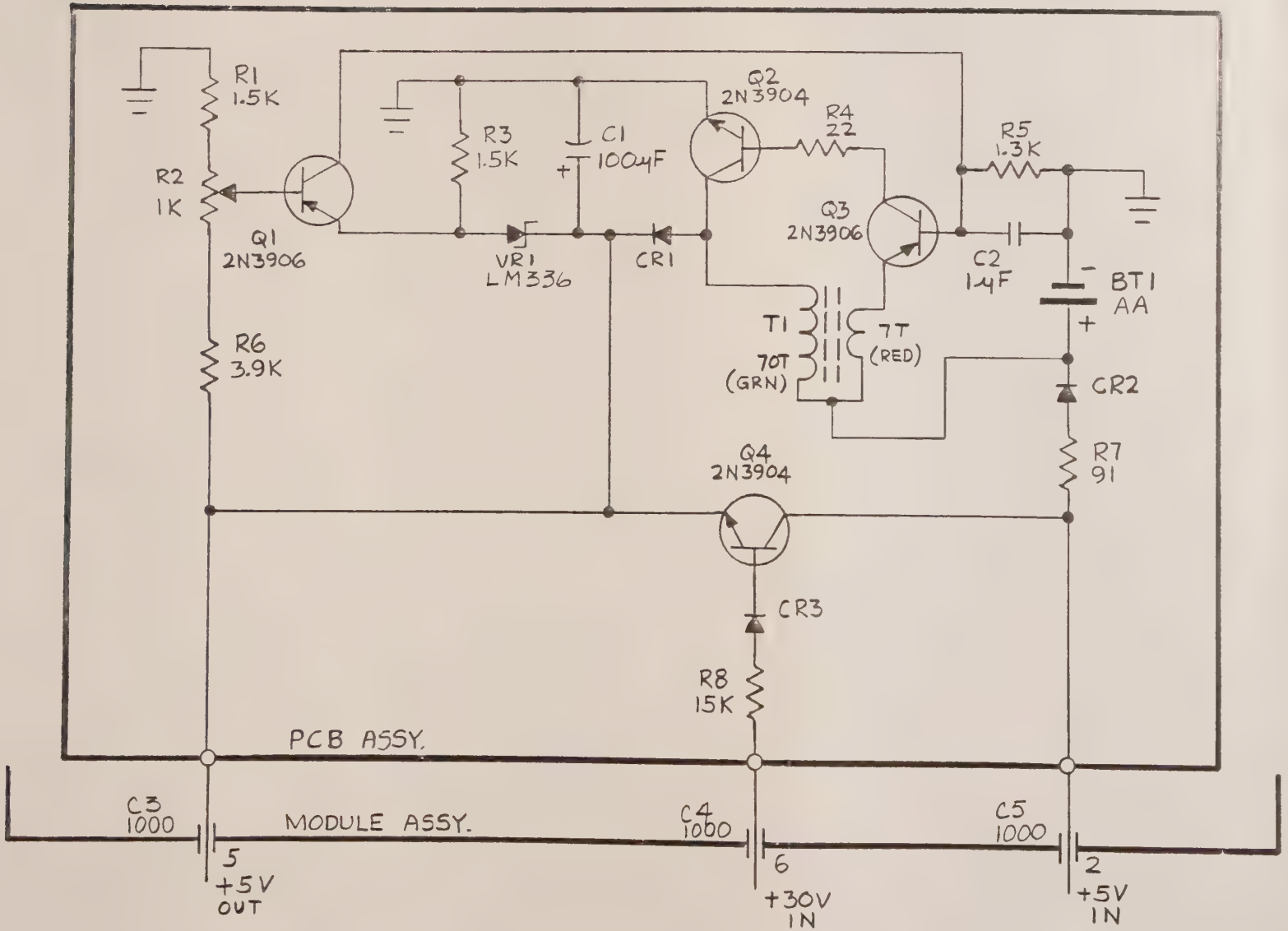

L106
L105
C109
C108
C106
C107
C105
C114
C102
C110
R105
C113
C111
R106
Q 102
C
B
E
R107
C112
C116
L104
C115
L102
R101
R102
C101
Q 101
C
B
E
L102
R 108
L101
C104
R 103
L107
R104
C103


M119-5
PSK DEMODULATOR
REV. C
OUT
IN
J3
J2
DIODE SWITCH BOARD
AMPLIFIER BOARD
OSCILLATOR BOARD
PHASELOCK BOARD
MX 1
CM-1
IC303A NE5530
IC303B NE5530
IC304 MC14011B
IC 1 MC14011B
IC302 11C44 ϕ DETECTOR
IC3C1 MC1350P
Q.01 2N5053
Q102 2N5053
Q201 2N5053
Q301 2N5053
2372 2N3906
CR401
CR402
CR403
CR404
CR301
CR302
CR303
CR1
CR2
+15V
-15V
+5V
ϕ LOCK OUTPUT
DEMODULATED DATA 5MHZ
50 MHZ DEMOD IN
DEMOD OUT
3.58 MHZ REF.


SCHEMATIC — M113
PILOT CARRIER NOTCHES
REV
FREQ 1
+18
R4 20K
R3 22K
INVERTED COMBINED PROGRAM
2
C1
6.8
R1 47K
R2 47K
R5 9.09K
R6 33.2
R7 154
WIDTH
R8 2K
R9 8.25K
R10 47K
R11 47K
R12 22K
R13 20K
FREQ. 2
IC1A
IC1B
IC1C
IC1D
LM339
R16 56K
R17 33K
R18 100K
R14 56K
R15 33K
Q1 2N3854A
Q2 2N3854A
Q3 MPS3702
C2 15
R19 150
R20 15M
CR1
CR2
C3 3
6.8
BLANKING
C4 1000
4
SWITCHED +18

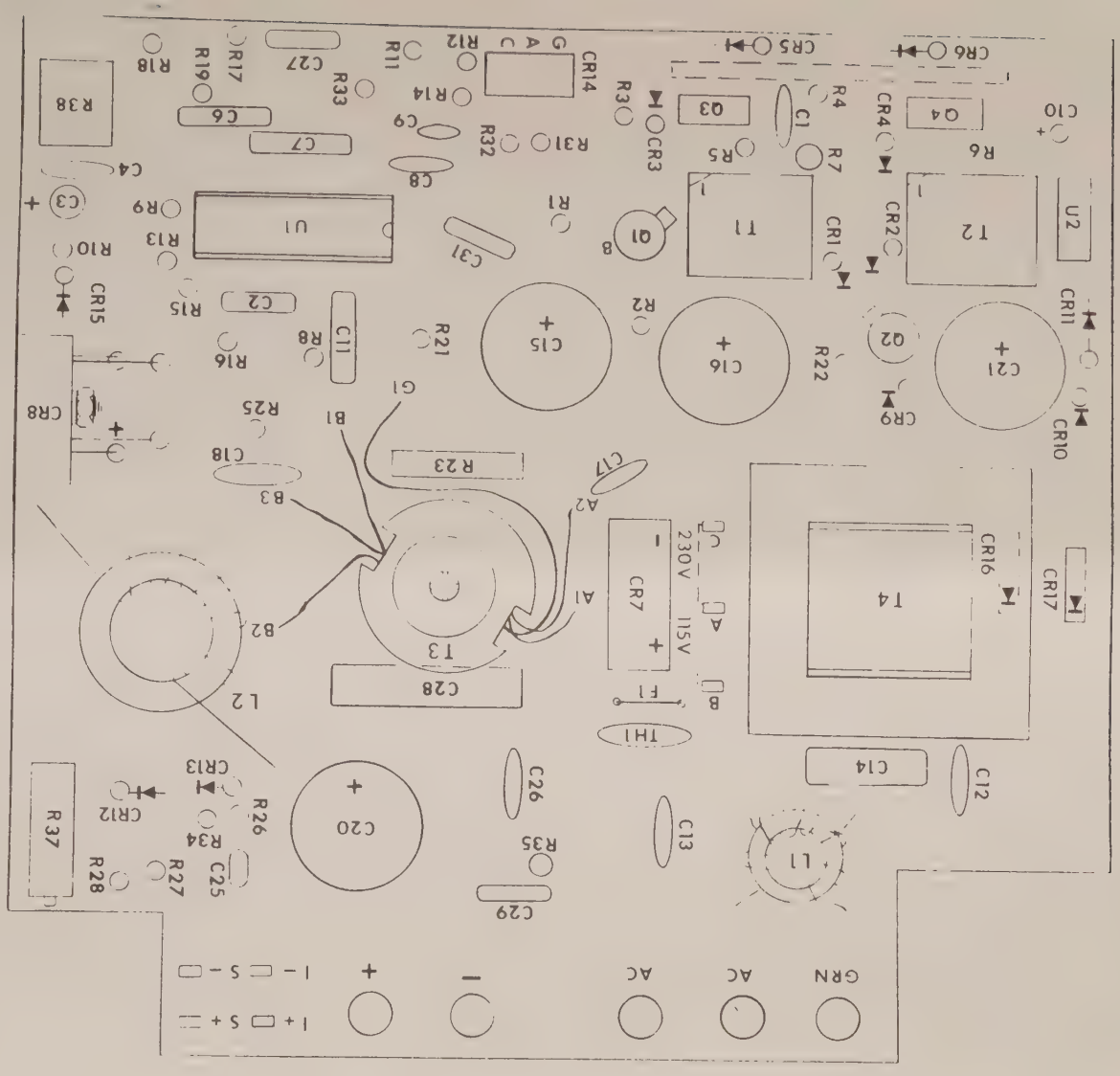
Z1007

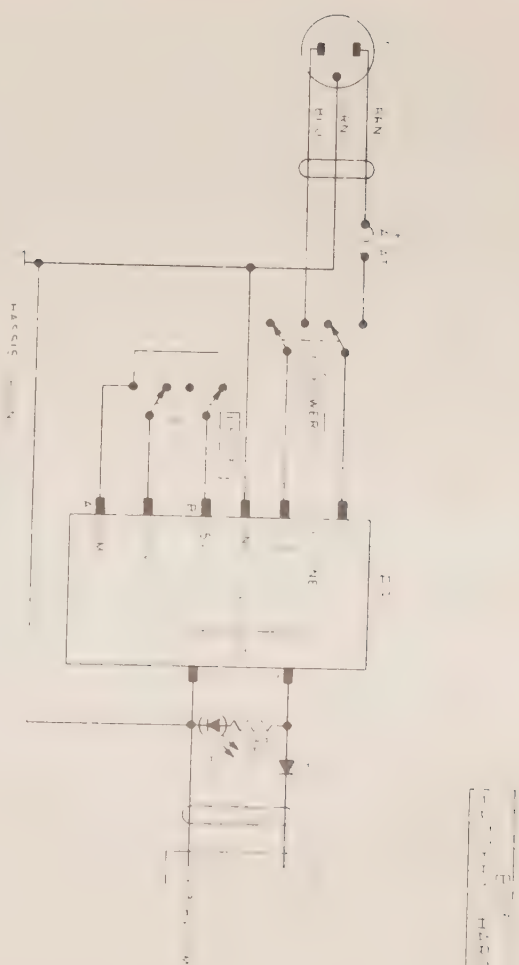


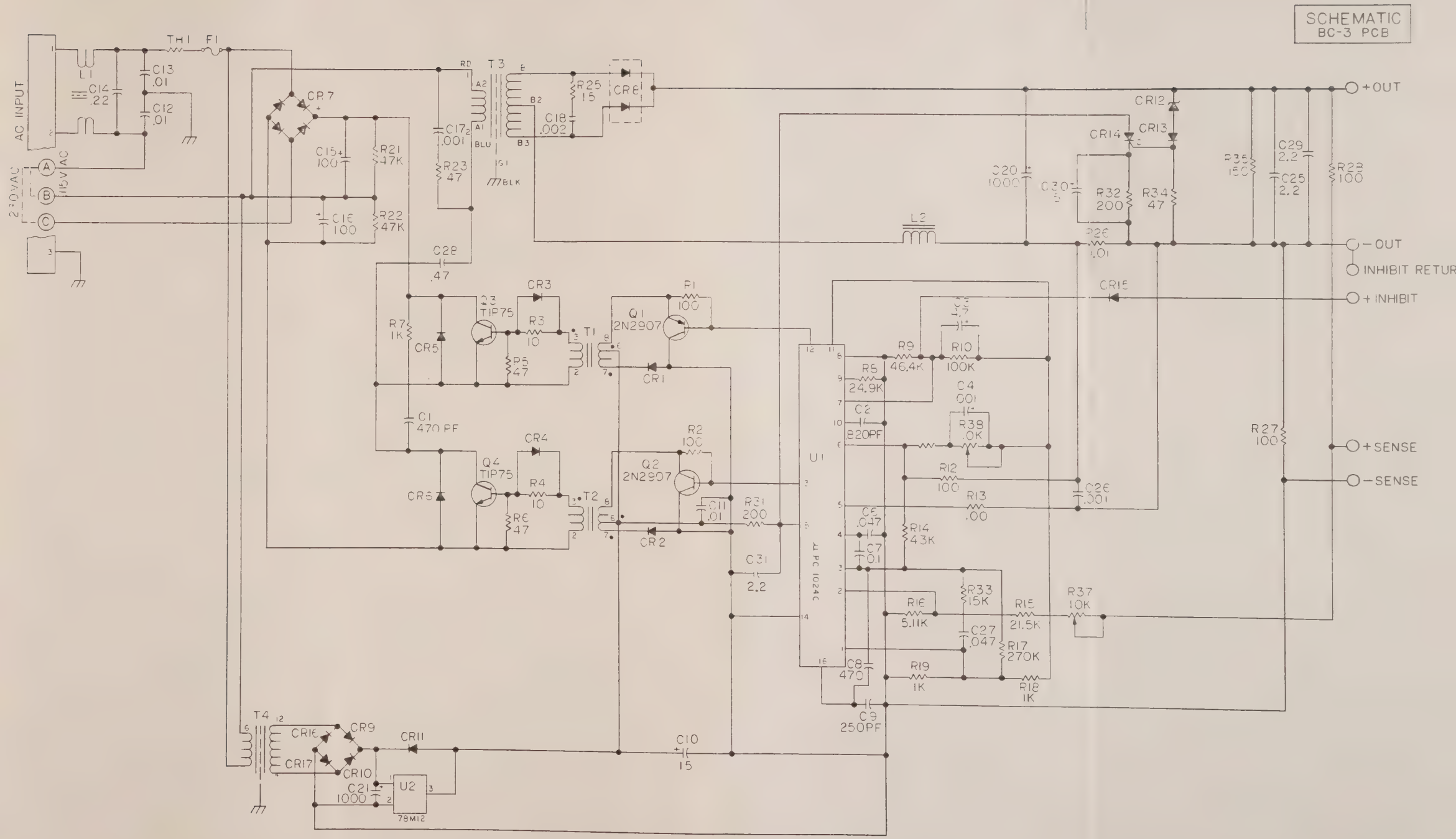


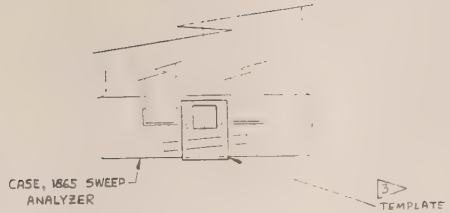
M152
BATTERY BACK-UP

REV


R18
R19
R17
C27
R33
R11
R12
C A G
CR14
CR5
CR6
R38
C6
R14
C9
R32
R31
R3
CR3
Q3
C1
R4
R7
CR4
Q4
C10
C7
C8
R5
R6
C4
R9
R13
U1
R1
Q1
T1
CR1
CR2
T2
U2
C3
R10
C31
B
CR15
R15
C2
C11
R8
R21
C15
R2
C16
R22
Q2
C21
CR11
CR10
CR9
R16
G1
B1
R25
CR8
C18
R23
C17
B3
A2
230V
115V
CR7
CR16
CR17
T4
B2
A1
T3
C28
F1
L2
TH1
C14
C12
CR13
C26
C20
C13
R26
CR12
R34
R35
L1
R37
R28
R27
C25
C29
GRN
AC
AC
+
-

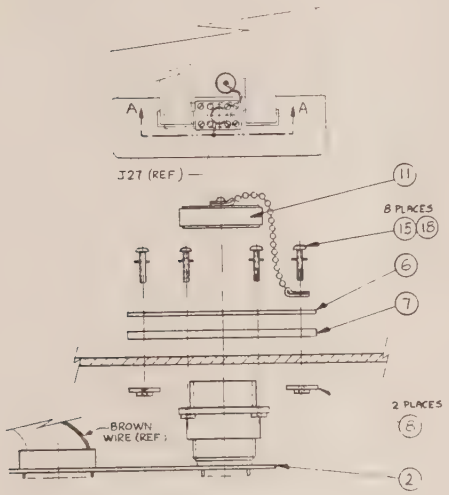



SCHEMATIC
BC-3 PCB
AC INPUT
230VAC
115VAC
TH1
F1
L1
C14 .22
C13 .01
C12 .01
CR7
C15 100
R21 47K
C16 100
R22 47K
T3
RD
A2
A1
BLU
B2
B3
BLK
S1
C17 .001
R23 47
C18 .002
R25 15
CR8
C28 .47
CR3
Q3 TIP75
R3 10
R5 47
R7 1K
CR5
T1
Q1 2N2907
R1 100
CR1
C1 470 PF
CR4
Q4 TIP75
R4 10
R6 47
CR6
T2
R2 100
Q2 2N2907
C11 .01
R31 200
CR2
C31 2.2
T4
CR16
CR9
CR17
CR10
CR11
C21 1000
U2
78M12
C10 15
U1
LM 1024C
C3 .47
R9 46.4K
R10 100K
R8 24.9K
C4 .001
C2 820PF
R39 .0K
R12 100
R13 .00
C5 .047
C7 .01
R14 43K
R16 5.11K
R33 15K
C27 .047
R15 21.5K
R37 10K
R17 270K
C8 470
R19 1K
R18 1K
C9 250PF
L2
C20 1000
C30
CR12
CR13
CR14
R32 200
R34 47
C26 .01
R35 150
C29 2.2
C25 2.2
R28 100
R27 100
C22 .001
CR15
+OUT
-OUT
INHIBIT RETUR
+ INHIBIT
+SENSE
-SENSE

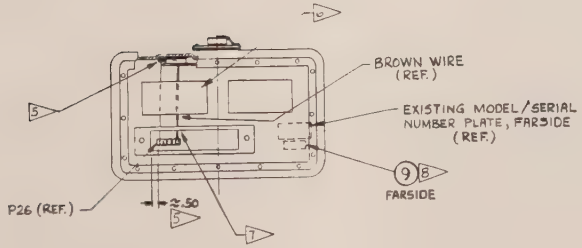


INSTALLATION PROCEDURE, CASE MODIFICATION & ASSEMBLY

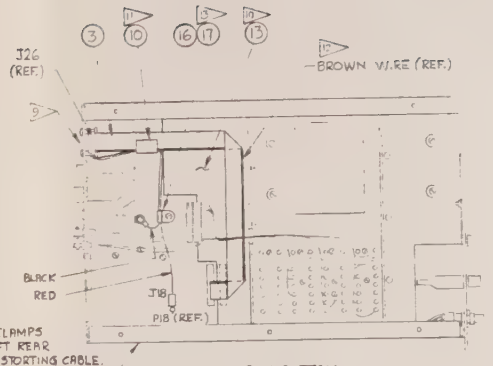
1. REMOVE (16) SCREWS THAT ATTACH FRONT PANEL OF CHASSIS ASSEMBLY TO CASE.
2. REMOVE CHASSIS ASSEMBLY FROM CASE.
3. CENTER TEMPLATE 1414-00-0001 BETWEEN (2) COVER STRAPS & ATTACH TO CASE AS SHOWN USING MASKING TAPE OR EQUIVALENT. DRILL (4) .113 DIA. HOLES, SCRIBE & CUT OUT SQUARE CONNECTOR OPENING.
4. REMOVE TEMPLATE & ASSEMBLE AS SHOWN IN SECTION A-A.
5. REMOVE RELEASE LINERS FROM (2) RIBBON CABLE CLAMPS (PART OF ITEM #2) & DRESS CABLE AT SLIGHT ANGLE TO LEFT REAR SIDE OF CHANNEL SO THAT .30 DIM. CAN BE HELD WITHOUT DISTORTING CABLE.
6. REMOVE FOAM BLOCK FROM LEFT SIDE OF REAR PLATE. PRESS RIBBON CABLE TO STICKY SURFACE OF REAR PLATE.
7. SEPARATE & ROUTE CONNECTOR BETWEEN FOAM & REAR PLATE. REPLACE FOAM BLOCK REMOVED IN STEP 6.
8. ATTACH LABEL (ITEM #9) DIRECTLY BELOW & CENTERED ON EXISTING MODEL / SERIAL NUMBER PLATE.

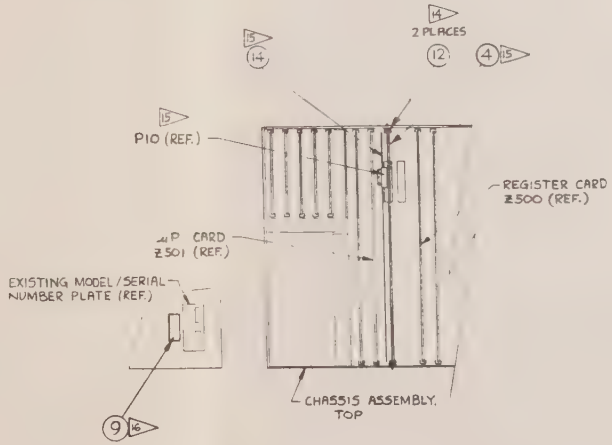


EXPLODED SECTION A-A 4
SCALE 1:1



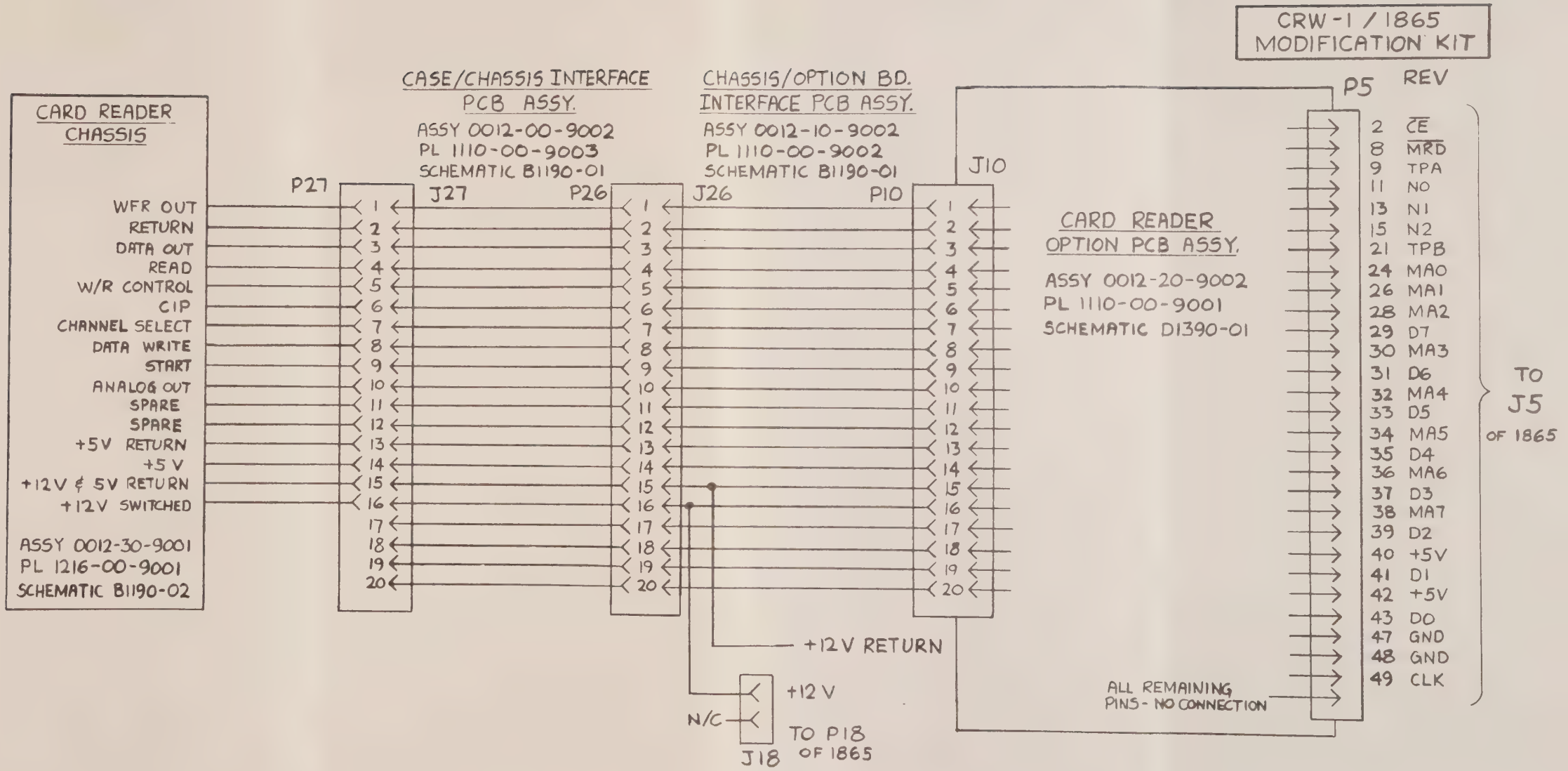
VIEW INTO CASE WITH CHASSIS ASSY. REMOVED

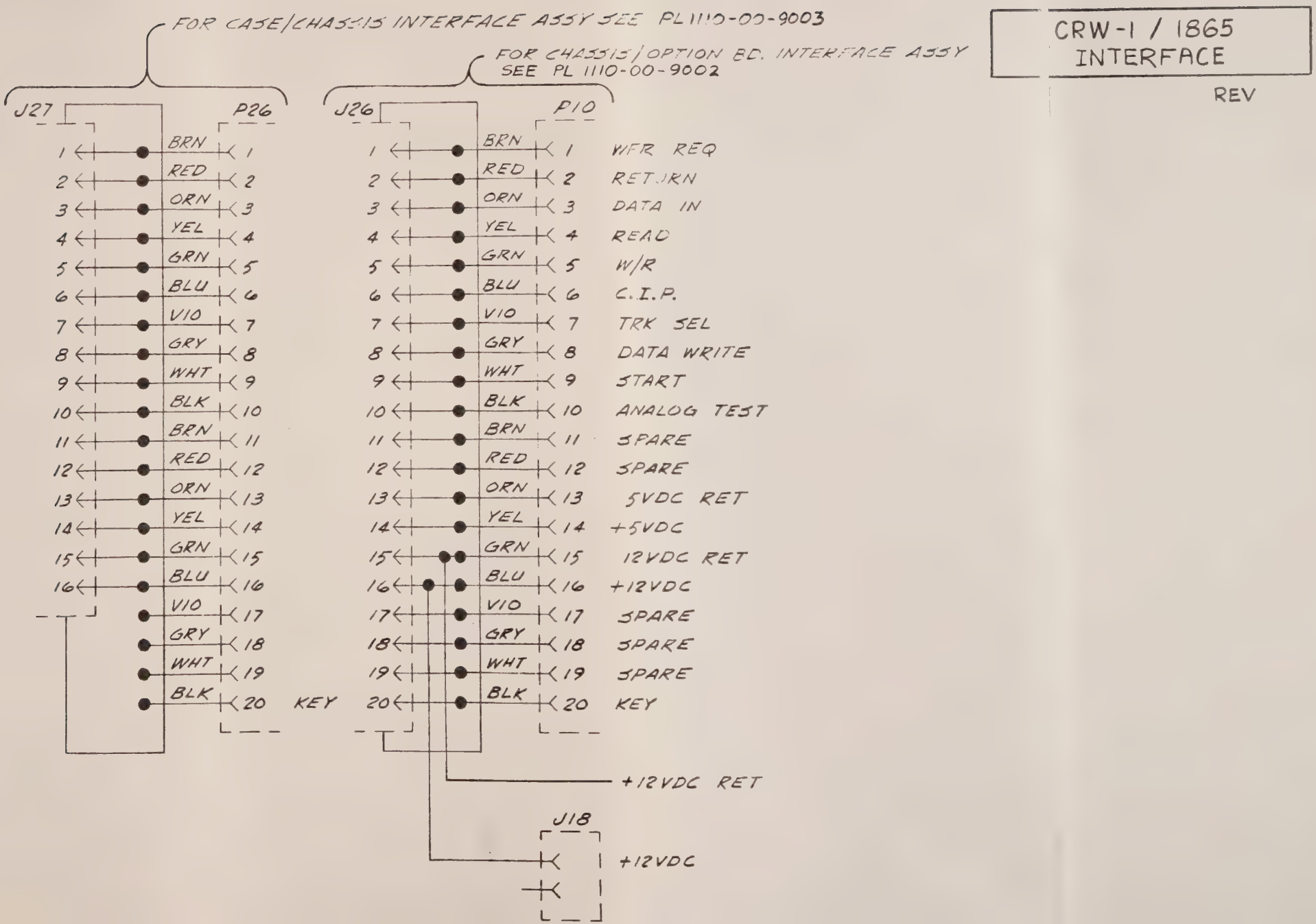


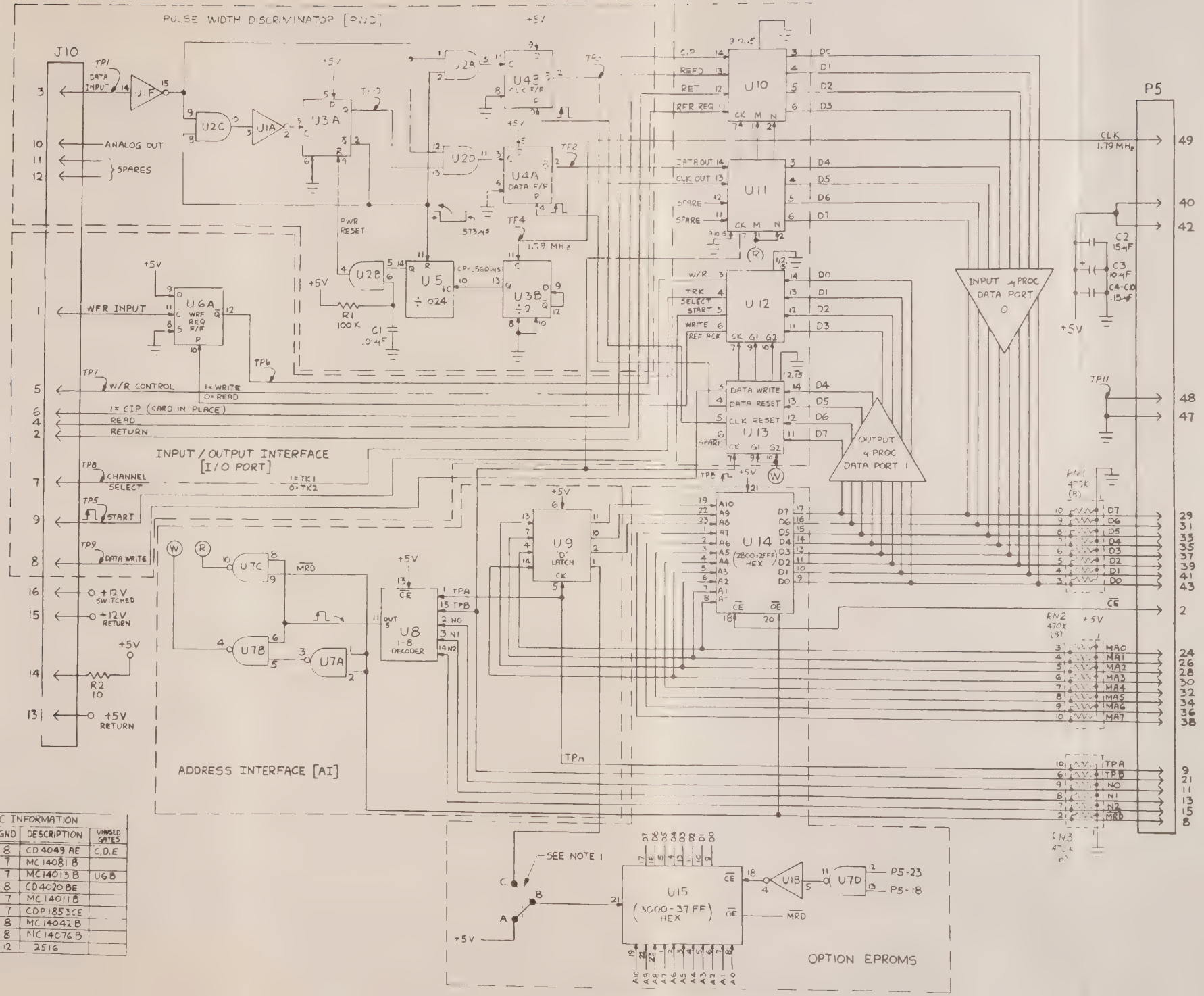


INSTALLATION PROCEDURE, CHASSIS MODIFICATION & ASSEMBLY

9. REMOVE (17) SCREWS ON TOP, (9) SCREWS ON BOTTOM & REMOVE (2) COVERS REMOVE COVER PLATE FROM 'OPTION' OPENING ON REAR PLATE. RETURN PLATE, (2) WASHERS & (2) HEX. NUTS TO STOCK. ATTACH PCB END OF RIBBON CABLE ASSEMBLY (ITEM #3) TO REAR PLATE AS SHOWN USING (2) SCREWS THAT PREVIOUSLY HELD COVER PLATE.
10. SLIDE INSULATOR (ITEM # 13) INTO PLACE AS SHOWN. (UNDER EXISTING WIRING HARNESS & CONNECTORS)
11. ATTACH CABLE CLAMP (ITEM # 10) TO RED & BLACK WIRES AND RIBBON CABLE (ITEM #3). REMOVE RELEASE LINER & ATTACH AS SHOWN.
12. FOLD & ROUTE RIBBON CABLE EXACTLY AS SHOWN NOTE LOCATION OF BROWN WIRE. INSERT CONNECTOR END THRU OPENING IN PCB AS SHOWN.
13. REMOVE 3 #4-40 x ¼ LG SCREW & ATTACH CABLE CLAMP (ITEM #17) USING #4-40 x 5/16 LG SCREW (ITEM #16). RETURN ORIGINAL #4-40 x ¼ LG SCREW TO STOCK. ATTACH J18 TO P18 ON PCB (RED WIRE). REMOVE SCREW ON GROUND PLANE OF PCB & ATTACH TERMINAL LUG OF BLACK WIRE AS SHOWN.
14. TURN CHASSIS ASSEMBLY OVER. ATTACH (2) CARD GUIDES (ITEM # 12) IN LOCATIONS SHOWN.
15. INSERT INSULATOR (ITEM # 14), CARD READER OPTION PCB (ITEM # 4), & ATTACH CONNECTOR END OF RIBBON CABLE ASSEMBLY TO J10 OF PCB AS SHOWN. NOTE ORDER (BACK TO FRONT).
    1. 4P PCB
    2. RIBBON CABLE
    3. INSULATOR
    4. CARD READER OPTION PCB
    5. OPEN
    6. REGISTER PCB
16. ATTACH LABEL (ITEM #9) DIRECTLY BELOW & CENTERED ON EXISTING MODEL / SERIAL NUMBER PLATE.
17. REASSEMBLE TOP & BOTTOM COVERS. REASSEMBLE CHASSIS ASSEMBLY TO CASE. ATTACH CONNECTOR P26 OF CASE TO J26 OF CHASSIS ASSEMBLY.

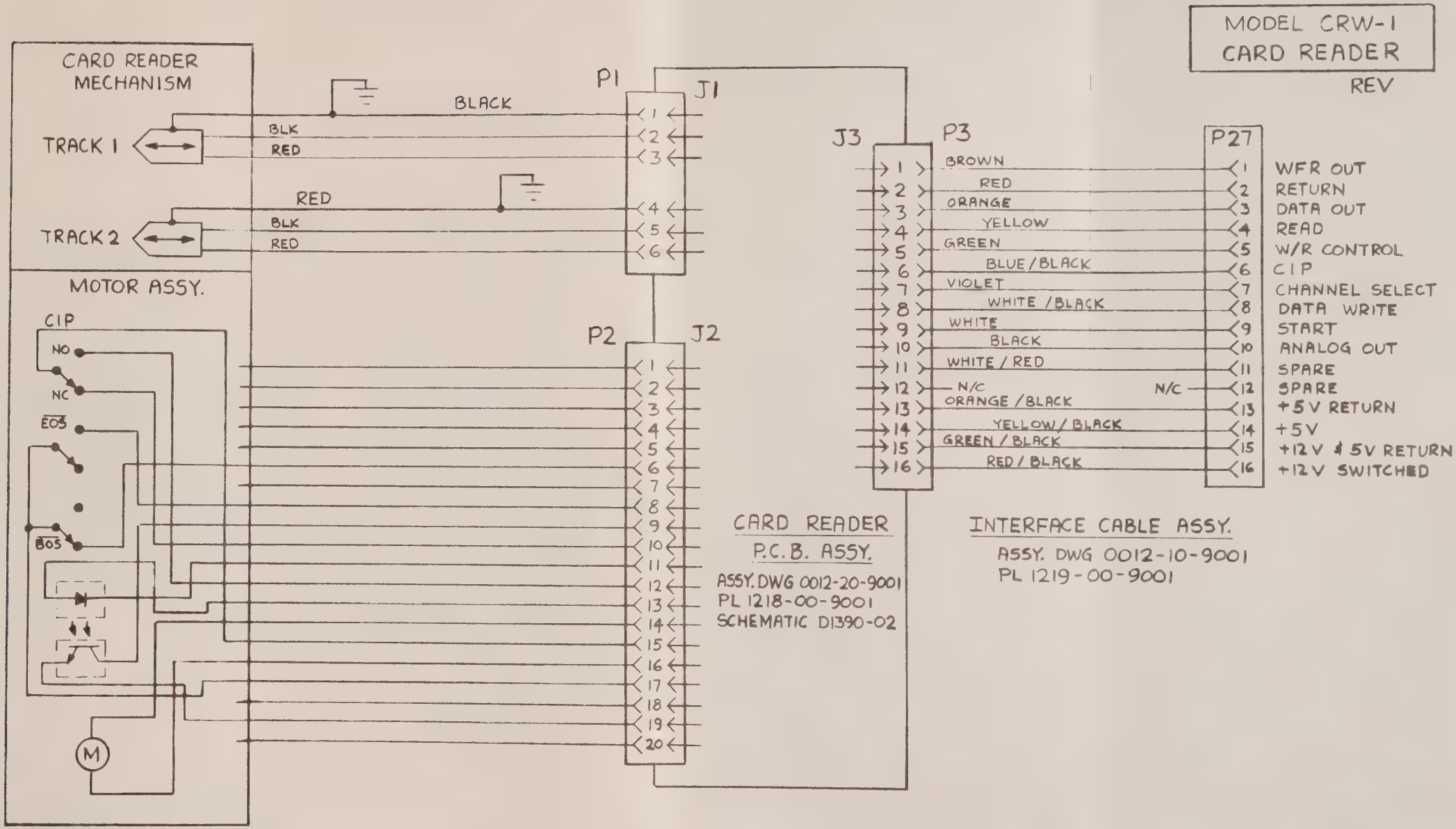

CRW-1 / 1865
MODIFICATION KIT
CARD READER
CHASSIS
WFR OUT
RETURN
DATA OUT
READ
W/R CONTROL
CIP
CHANNEL SELECT
DATA WRITE
START
ANALOG OUT
SPARE
SPARE
+5V RETURN
+5 V
+12V & 5V RETURN
+12V SWITCHED
ASSY 0012-30-9001
PL 1216-00-9001
SCHEMATIC B1190-02
CASE/CHASSIS INTERFACE
PCB ASSY.
ASSY 0012-00-9002
PL 1110-00-9003
SCHEMATIC B1190-01
P27
J27
P26
CHASSIS/OPTION BD.
INTERFACE PCB ASSY.
ASSY 0012-10-9002
PL 1110-00-9002
SCHEMATIC B1190-01
J26
P10
J10
CARD READER
OPTION PCB ASSY.
ASSY 0012-20-9002
PL 1110-00-9001
SCHEMATIC D1390-01
P5
REV
2 CE
8 MRD
9 TPA
11 NO
13 N1
15 N2
21 TPB
24 MA0
26 MA1
28 MA2
29 D7
30 MA3
31 D6
32 MA4
33 D5
34 MA5
35 D4
36 MA6
37 D3
38 MA7
39 D2
40 +5V
41 D1
42 +5V
43 D0
47 GND
48 GND
49 CLK
TO J5 OF 1865
+12V RETURN
+12 V
N/C
TO P18 OF 1865
J18
ALL REMAINING PINS - NO CONNECTION

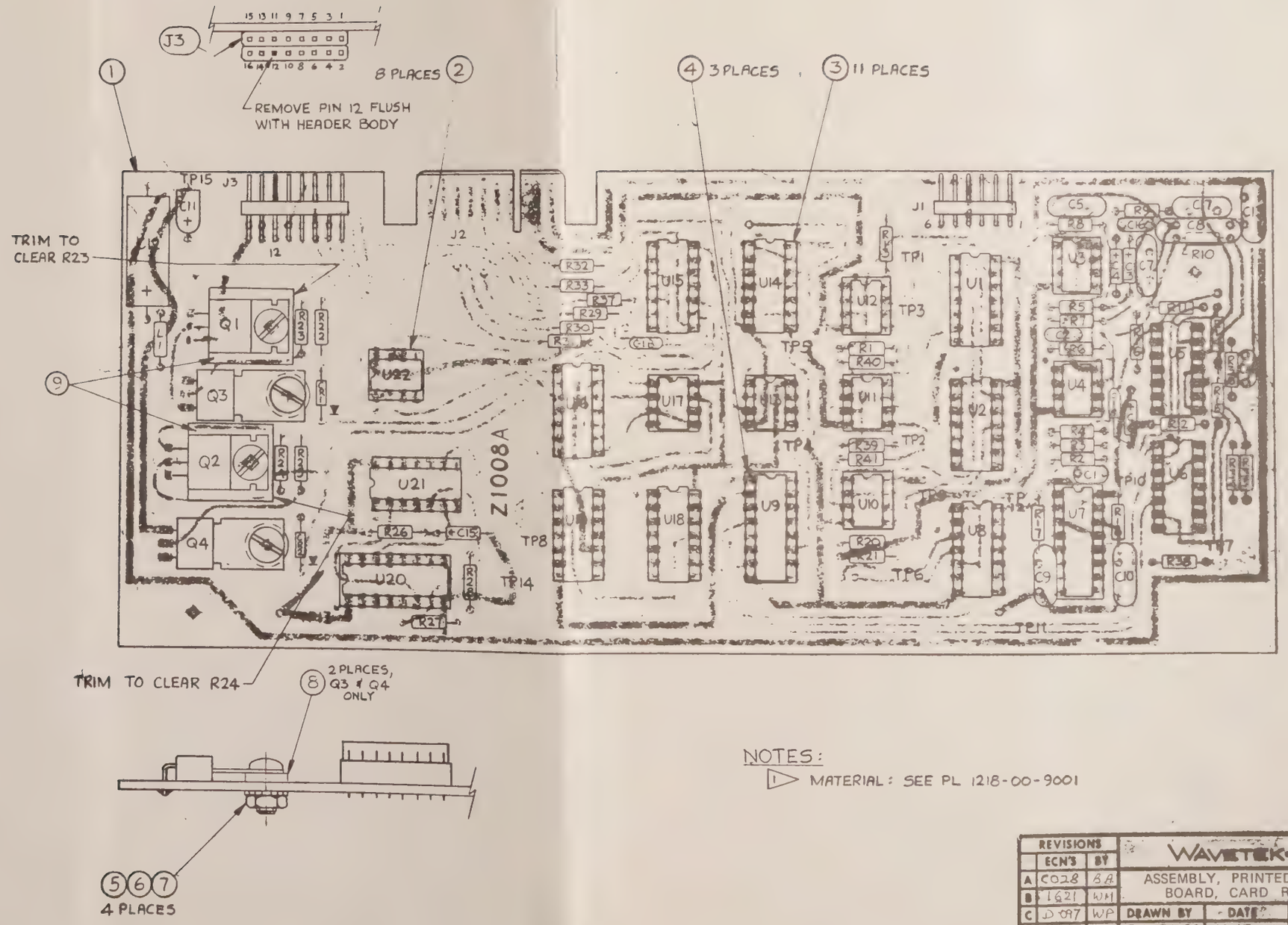

FOR CASE/CHASSIS INTERFACE ASSY SEE PL 1110-00-9003
FOR CHASSIS/OPTION BD. INTERFACE ASSY SEE PL 1110-00-9002
CRW-1 / 1865 INTERFACE
REV
J27
P26
J26
P10
1 BRN 1
2 RED 2
3 ORN 3
4 YEL 4
5 GRN 5
6 BLU 6
7 VIO 7
8 GRY 8
9 WHT 9
10 BLK 10
11 BRN 11
12 RED 12
13 ORN 13
14 YEL 14
15 GRN 15
16 BLU 16
17 VIO 17
18 GRY 18
19 WHT 19
20 BLK 20 KEY
1 BRN 1 WFR REQ
2 RED 2 RETURN
3 ORN 3 DATA IN
4 YEL 4 READ
5 GRN 5 W/R
6 BLU 6 C.I.P.
7 VIO 7 TRK SEL
8 GRY 8 DATA WRITE
9 WHT 9 START
10 BLK 10 ANALOG TEST
11 BRN 11 SPARE
12 RED 12 SPARE
13 ORN 13 5VDC RET
14 YEL 14 +5VDC
15 GRN 15 12VDC RET
16 BLU 16 +12VDC
17 VIO 17 SPARE
18 GRY 18 SPARE
19 WHT 19 SPARE
20 BLK 20 KEY
+12VDC RET
J18
+12VDC



REFERENCE DESIGNATIONS	
LAST USED	NOT USED
C10	
J10	J1 THRU J9
P5	P1 THRU P4
R2	
RN3	
TP11	
U15	

IC INFORMATION				
IC NO.	+5V	GND	DESCRIPTION	UNUSED GATES
U1	1	8	CD4049AE	C,D,E
U2	14	7	MC14081B	
U3,4,6	14	7	MC14013B	U6B
U5	16	8	CD4020BE	
U7	14	7	MC14011B	
U8	16	7	CDP1853CE	
U9	16	8	MC14042B	
U16,11,12,13	16	8	MC14076B	
U14,15	24	12	2516	

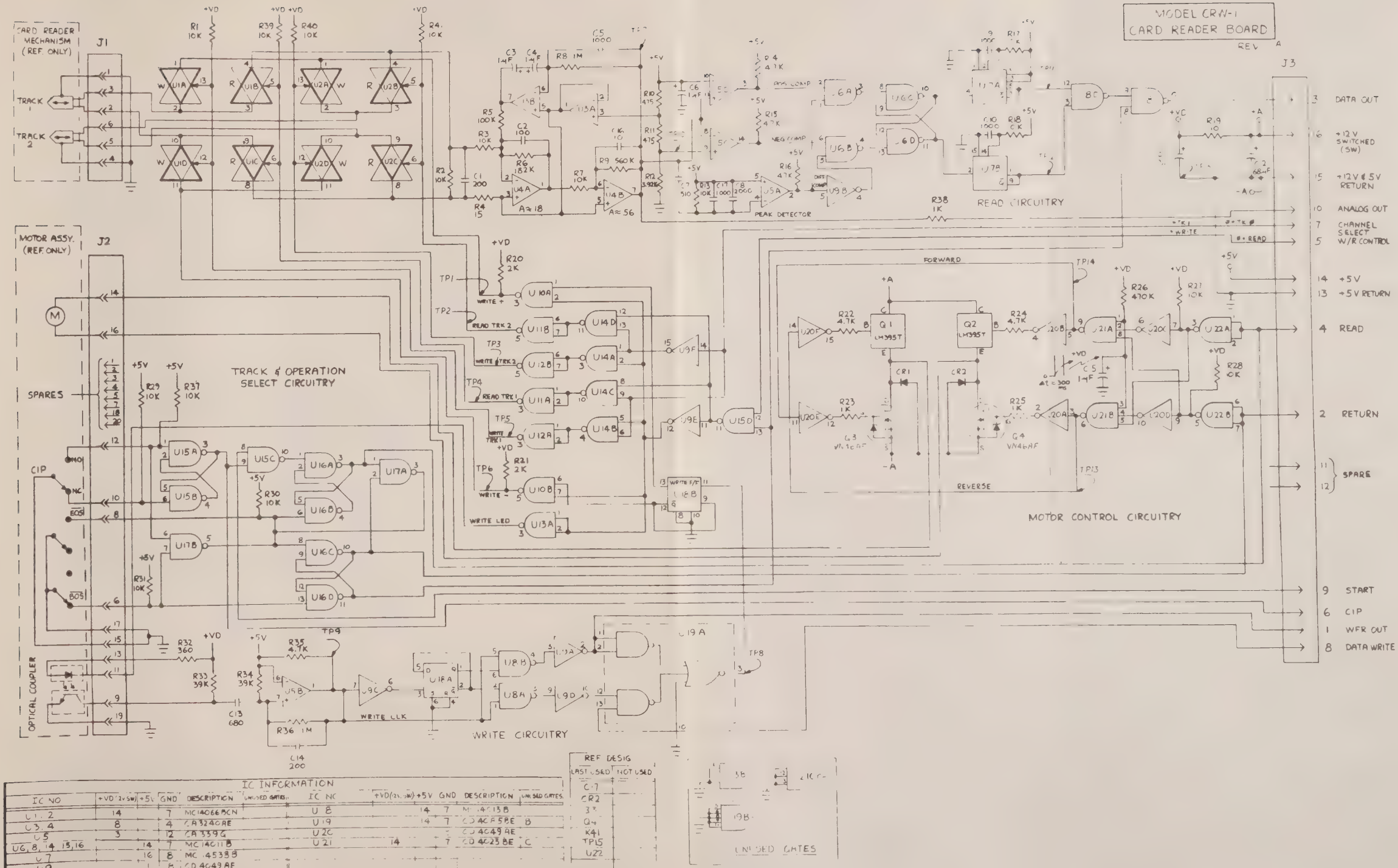

MODEL CRW-1
CARD READER
REV
CARD READER MECHANISM
TRACK 1
TRACK 2
BLACK
BLK
RED
RED
BLK
RED
MOTOR ASSY.
CIP
NO
NC
EOS
BOS
M
P1
J1
P2
J2
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
CARD READER
P.C.B. ASSY.
ASSY. DWG 0012-20-9001
PL 1218-00-9001
SCHEMATIC D1390-02
J3
P3
P27
BROWN
RED
ORANGE
YELLOW
GREEN
BLUE/BLACK
VIOLET
WHITE /BLACK
WHITE
BLACK
WHITE / RED
N/C
N/C
ORANGE /BLACK
YELLOW/ BLACK
GREEN / BLACK
RED / BLACK
WFR OUT
RETURN
DATA OUT
READ
W/R CONTROL
CIP
CHANNEL SELECT
DATA WRITE
START
ANALOG OUT
SPARE
SPARE
+5V RETURN
+5V
+12V & 5V RETURN
+12V SWITCHED
INTERFACE CABLE ASSY.
ASSY. DWG 0012-10-9001
PL 1219-00-9001



NOTES:

1. MATERIAL: SEE PL 1218-00-9001

REVISIONS			WAVETEK
	ECN'S	BY	
A	C028	BA	ASSEMBLY, PRINTED CIRCUIT BOARD, CARD READER
B	1621	WM	
C	D097	WP	DRAWN BY: G.L. RADER — DATE: 10-15-80 — NUMBER: 0012-20-9001
D			
E			APP'D: — DATE: 1-5-81

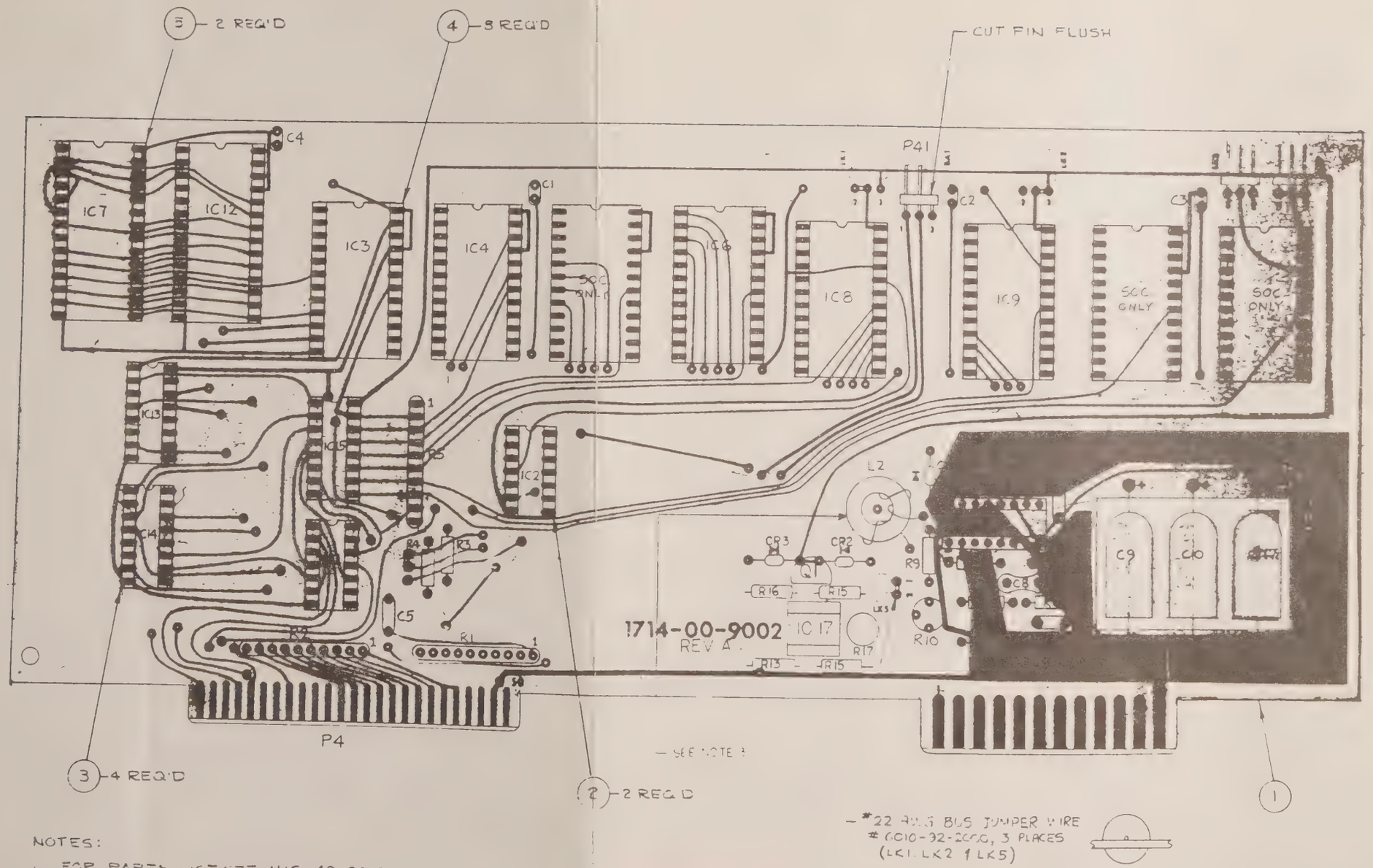


IC INFORMATION

IC NO	+VD (12V SW)	+5V	GND	DESCRIPTION	UNUSED GATES	IC NO	+VD (12V SW)	+5V	GND	DESCRIPTION	UNUSED GATES
U1, 2	14		7	MC14066BCN		U8		14	7	MC14013B	
U3, 4	8		4	CA3240AE		U19		14	7	CD4011BE	B
U5	3		12	CA3596		U20				CD4049AE	
U6, 8, 14, 15, 16		14	7	MC14011B		U21	14		7	CD4023BE	C
U7		16	8	MC14538B							
U9			8	CD4049AF							
U10, 11, 12, 13, 17, 22			8	CD4011BE	U13B						

REF DESIG
LAST USED / NOT USED
C7
CR2
3?
Q4
K4?
TP15
U22

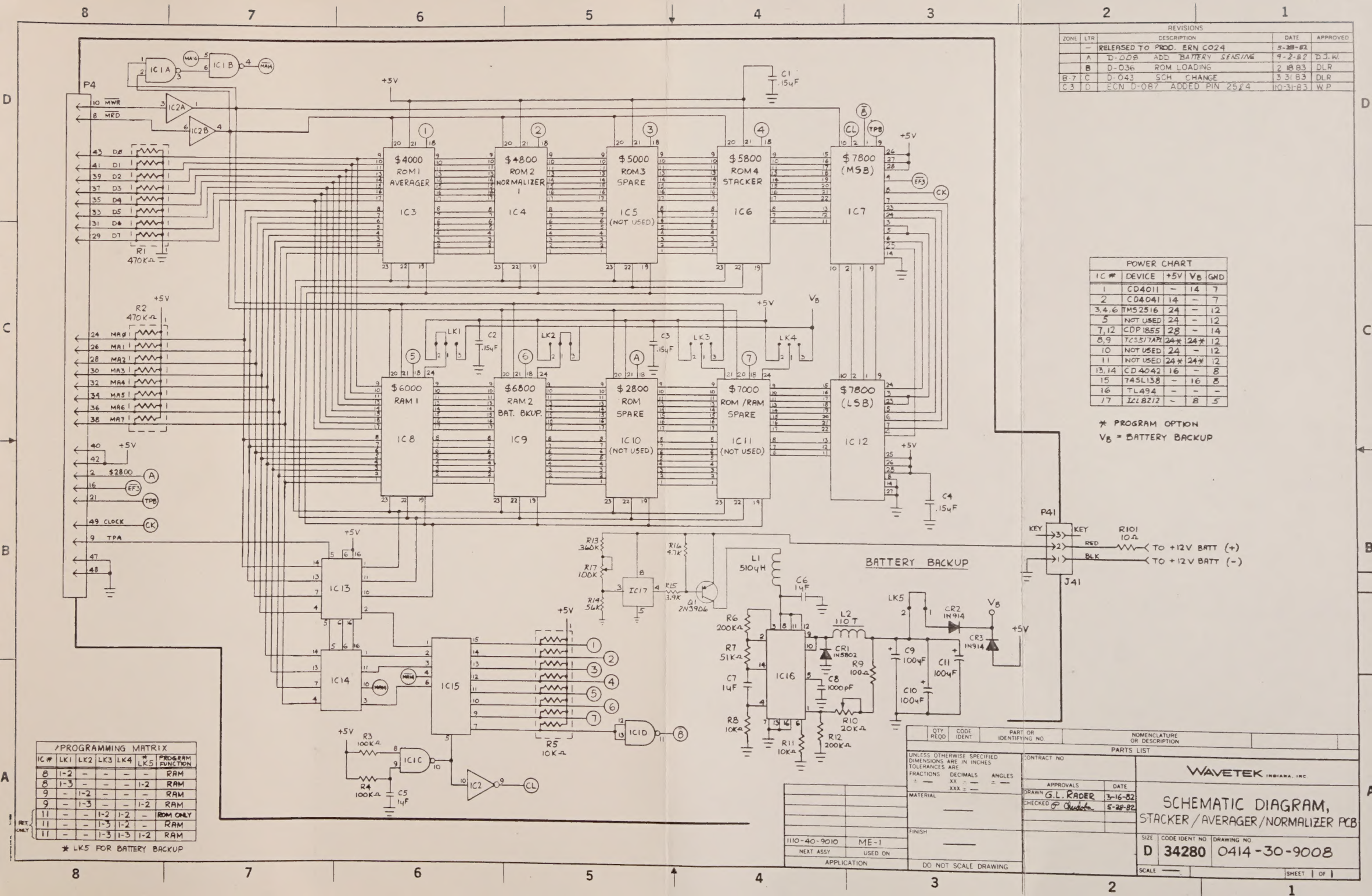
UNUSED GATES
3B
14
7
19B



NOTES:

1. FOR PARTS LIST SEE 1110-40-9010
2. SCALE 2:1
3. CENTER L1 WITH DOT ON BOARD AND MOUNT WITH HOT MELT GLUE.

REVISIONS			WAVETEK
	ECN'S	BY	
A	D 008	DLR	ASSY. DWG. P.C. BOARD STACKER/ [illegible]
B			
C			DRAWN BY – DATE
D			N. GAY – 2-25-82
E			APP'D – [illegible]



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	–	RELEASED TO PROD. ERN C024	5-28-82	
	A	D-008 ADD BATTERY SENSING	9-2-82	D.J.W.
	B	D-036 ROM LOADING	2 18 83	DLR
B-7	C	D-043 SCH CHANGE	3 31 83	DLR
C3	D	ECN D-087 ADDED PIN 25 & 4	10-31-83	W.P.

POWER CHART				
IC #	DEVICE	+5V	V_B	GND
1	CD4011	–	14	7
2	CD4041	14	–	7
3,4,6	TMS2516	24	–	12
5	NOT USED	24	–	12
7,12	CDP1855	28	–	14
8,9	TC5517APL	24*	24*	12
10	NOT USED	24	–	12
11	NOT USED	24*	24*	12
13,14	CD4042	16	–	8
15	74SL138	–	16	8
16	TL494	–	–	–
17	ICL8212	–	8	5

* PROGRAM OPTION
V_B = BATTERY BACKUP

PROGRAMMING MATRIX						
IC #	LK1	LK2	LK3	LK4	*LK5	PROGRAM FUNCTION
8	1-2	–	–	–	–	RAM
8	1-3	–	–	–	1-2	RAM
9	–	1-2	–	–	–	RAM
9	–	1-3	–	–	1-2	RAM
11	–	–	1-2	1-2	–	ROM ONLY
11	–	–	1-3	1-2	–	RAM
11	–	–	1-3	1-3	1-2	RAM

RET. ONLY

* LK5 FOR BATTERY BACKUP

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ± — DECIMALS XX ± — XXX ± — ANGLES ± —
MATERIAL —
FINISH —
DO NOT SCALE DRAWING

CONTRACT NO

APPROVALS	DATE
DRAWN G.L. RADER	3-16-82
CHECKED [illegible]	5-28-82

1110-40-9010	ME-1
NEXT ASSY	USED ON
APPLICATION	

WAVETEK INDIANA, INC.

SCHEMATIC DIAGRAM, STACKER/AVERAGER/NORMALIZER PCB

SIZE	CODE IDENT NO	DRAWING NO
D	34280	0414-30-9008

SCALE — SHEET 1 OF 1

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